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AMERICAN GAS JOURNAL

90th YEAR — DECEMBER 1948 — VOL. 169 NO. 6

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DIAPHRAGM

Success Story

CHAPTER 1

Gas engineers took years of testing in service to determine whether VULCAN Molded Diaphragms meet the exacting requirements of the industry, and whether VULCANS afford worthwhile improvements and advantages.

CHAPTER 2

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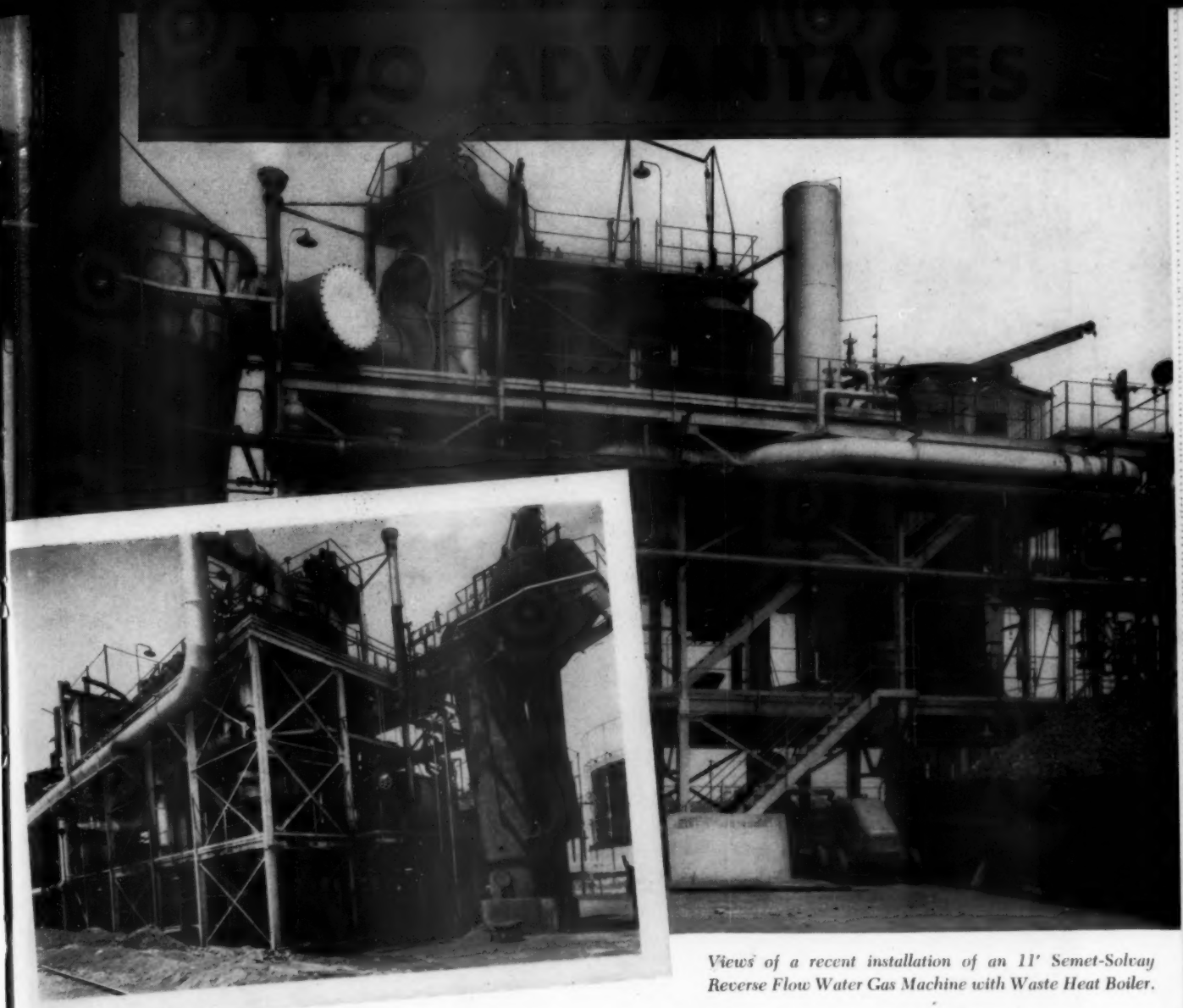
Gas Plant Equipment and Industrial Furnaces



Views of a recent installation of an 11′ Semet-Solvay Reverse Flow Water Gas Machine with Waste Heat Boiler.

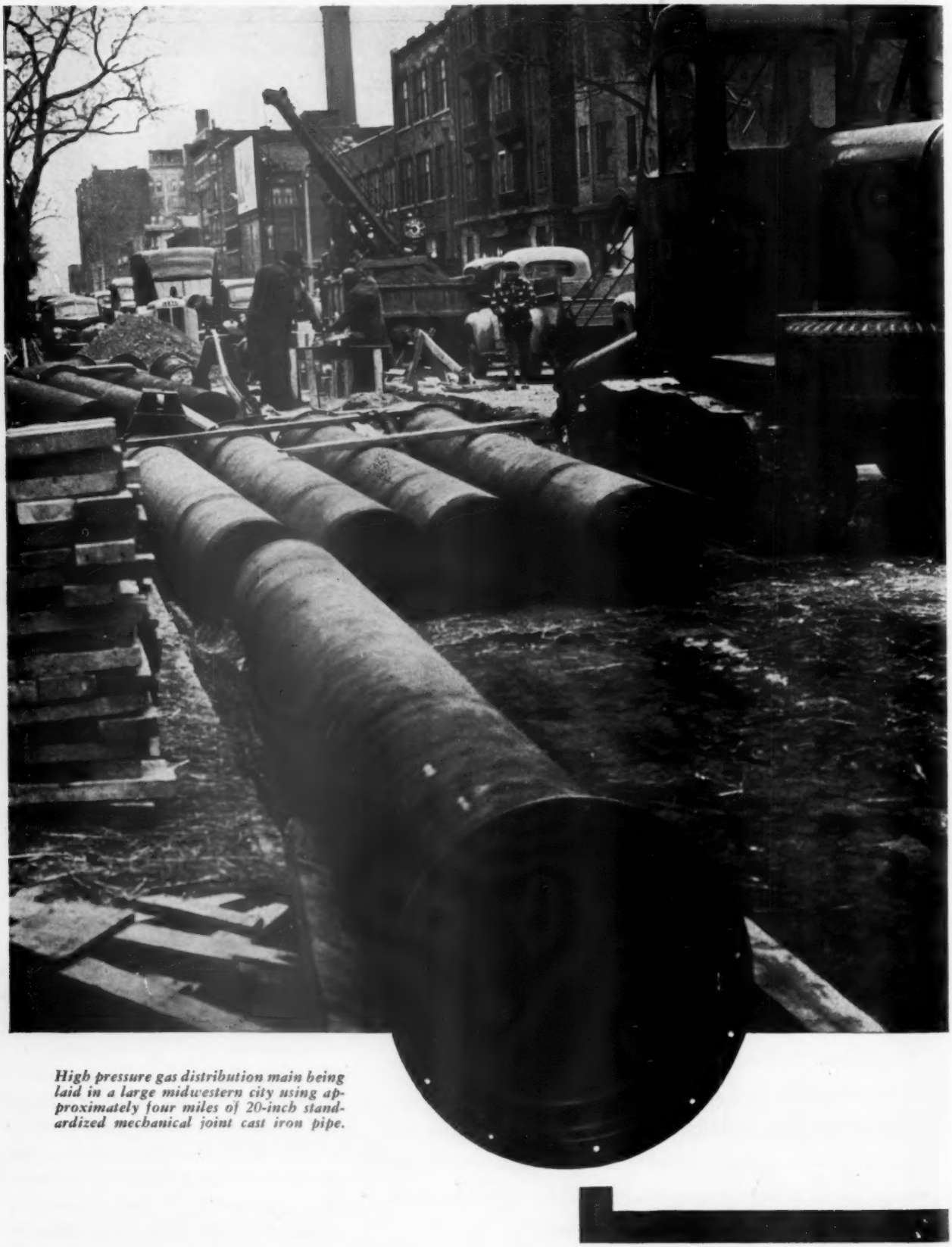
SHORTAGES and excessive costs of gas oil and solid fuel plague the gas production man. And these headaches probably will remain well into the foreseeable future.

One form of relief is available in the Semet-Solvay Reverse Flow Water Gas Machine – designed to offer the fullest *flexibility* and *efficiency*.

Since the first installation in 1937, this machine has proved to be singularly sound in design. Operations in different parts of the country under widely varying conditions have demonstrated its essential worth.

FLEXIBILITY. Generator fuel and carburetor oil can be changed to take advantage of market conditions. Coke, anthracite or coke with high percentages of bituminous coal can be used. Gas oil, Bunker C oil or intermediate grades can be used as carbureting oil without changes in the machine.

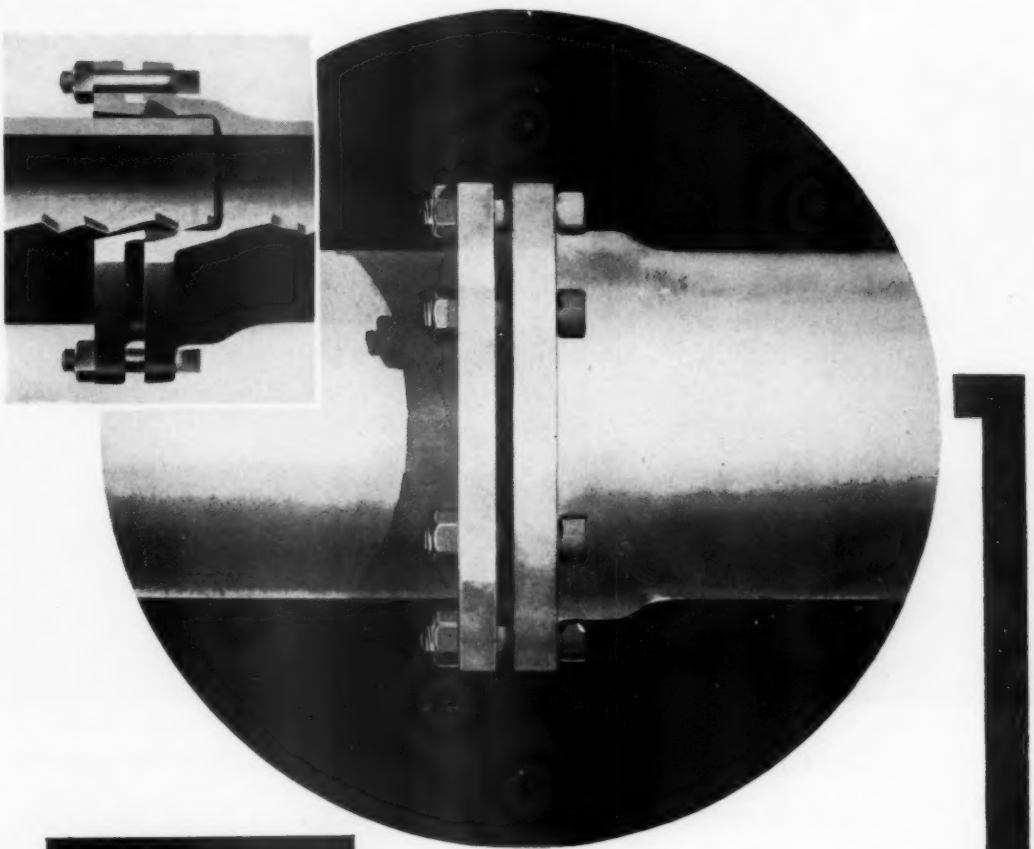
EFFICIENCY. Higher efficiencies are obtained due to counter-current flow of blue gas and oil fog. Carbon deposits resulting from heavy oil carburetion are utilized, thus reducing fuel consumption. Oil with a Conradson carbon content of as high as 15% has been successfully employed with no loss in operating efficiency.



High pressure gas distribution main being laid in a large midwestern city using approximately four miles of 20-inch standardized mechanical joint cast iron pipe.

GROWTH.

Steadily growing is the use of standardized mechanical joint cast iron pipe for distribution and feeder mains *regardless of pressures or types of gas.* For example, a large midwestern city has recently completed a four-mile, 20-inch, high pressure cast iron gas distribution main to carry manufactured gas at 15 to 25 pounds pressure (see installation photo on page opposite). A few years hence this main will be used as a feeder main to bring in natural gas at 50 pounds operating pressure. The ability of standardized mechanical joints to give bottle-tight performance with dry gas at high pressures is well confirmed. The ability of cast iron pipe to serve for more than a century is proved by service records. Cast Iron Pipe Research Assn., T. F. Wolfe, Engr., Peoples Gas Bldg., Chicago 3.



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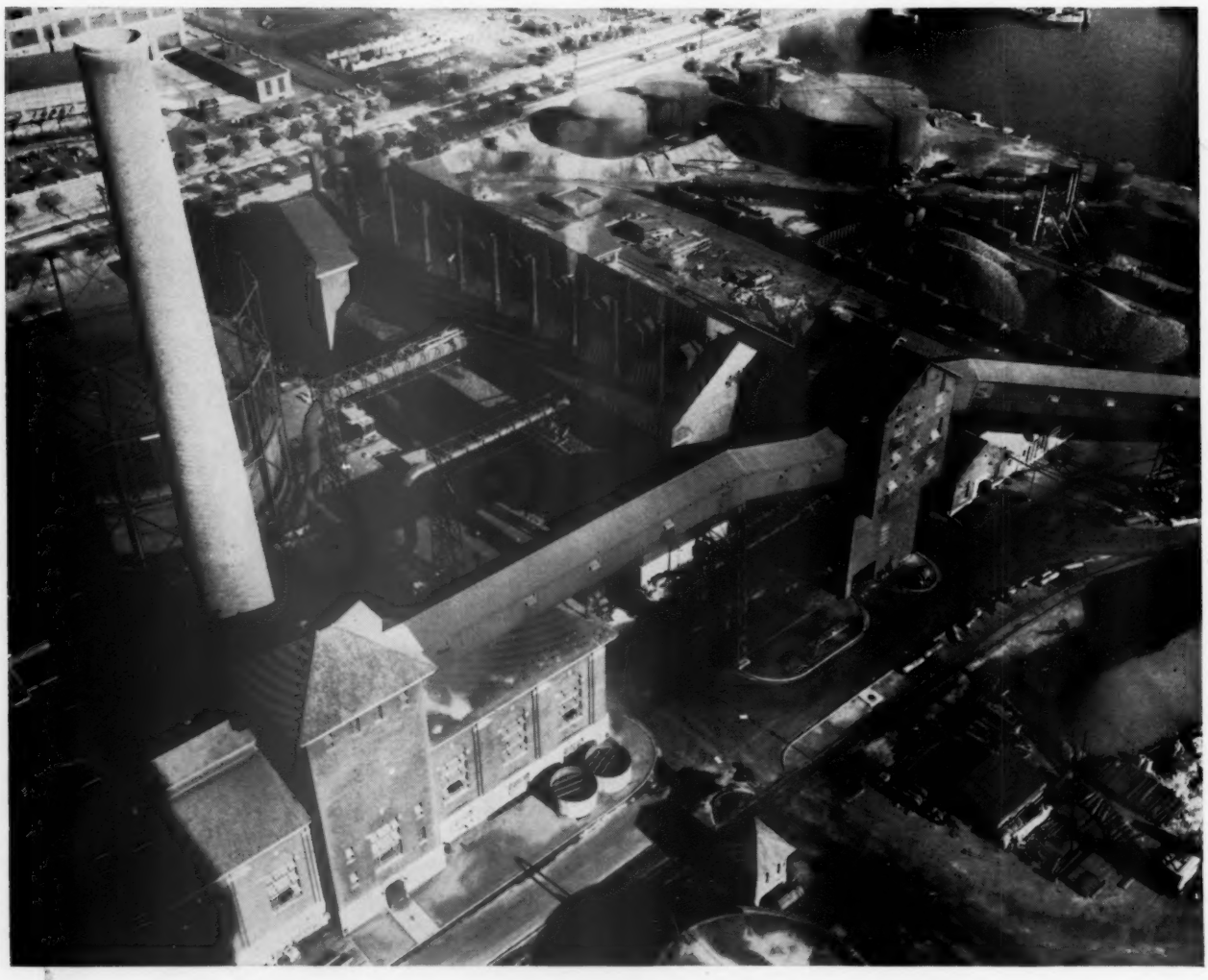
Standardized **MECHANICAL JOINT**

PIPE

THE NEW GROWTH IN THE GAS INDUSTRY



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PUBLIC SERVICE ELECTRIC AND GAS COMPANY
NEWARK, N. J.

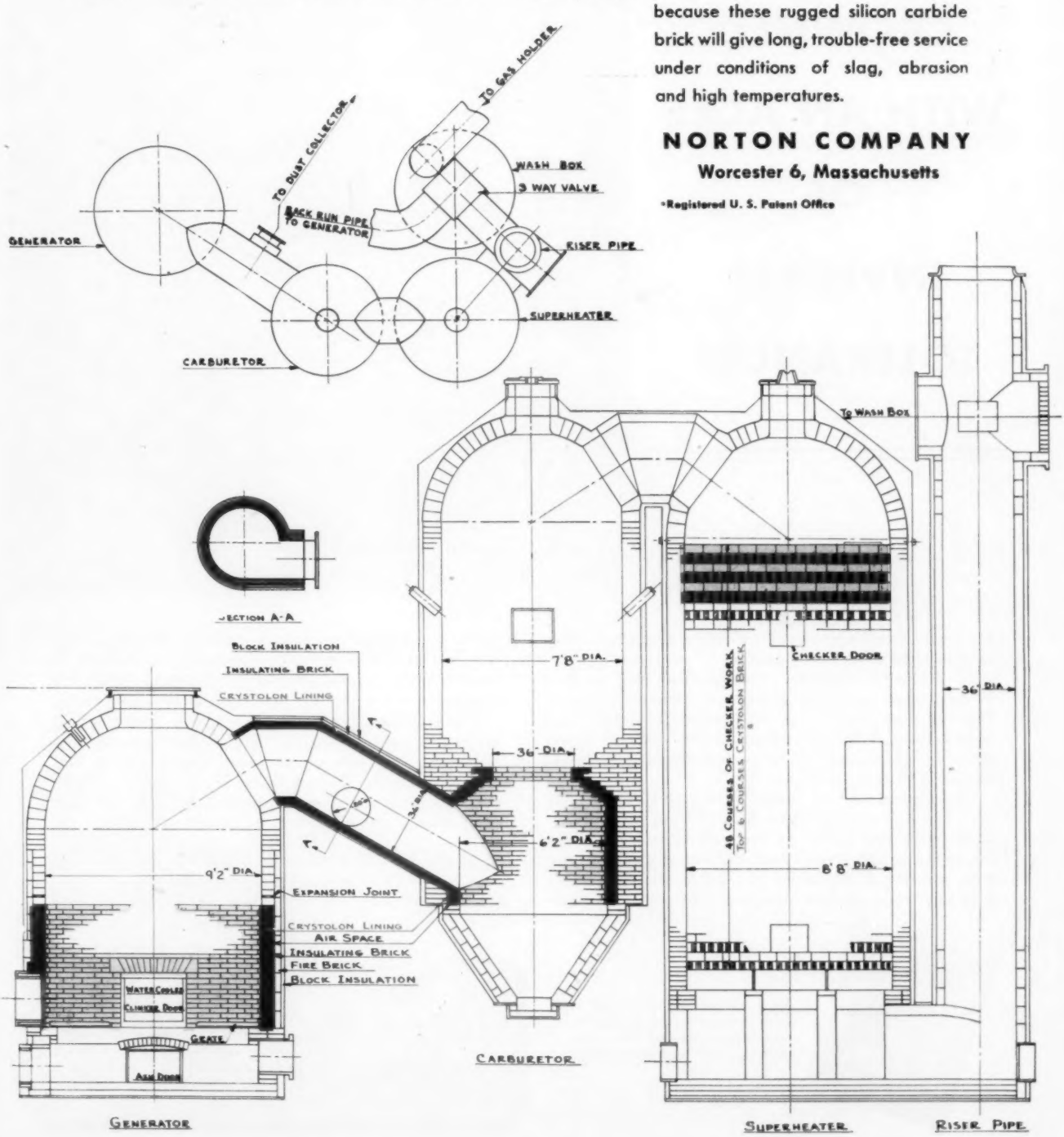
UNITED ENGINEERS & CONSTRUCTORS INC
NEW YORK 17 PHILADELPHIA 5 CHICAGO 2

In Generator, Carburetor and Superheater It Pays to Install CRYSTOLON* Brick

The drawing below shows the installation of CRYSTOLON Brick in a reverse flow, open carburetor type of water gas set. Twenty-four courses of CRYSTOLON Brick were laid in the generator, extending up five feet from the grate line. A full lining of CRYSTOLON Brick was set in the generator offtake, and 28 courses of these brick were laid in the base of the carburetor. In some recent installations six courses of CRYSTOLON Brick have also been added to the checkerwork in the top of the superheater. CRYSTOLON Brick are selected because these rugged silicon carbide brick will give long, trouble-free service under conditions of slag, abrasion and high temperatures.

NORTON COMPANY
Worcester 6, Massachusetts

*Registered U. S. Patent Office



CROWNED WITH AN ACRE OF INVISIBLE TOLERANCES

Here's the world's largest all-welded, wet-seal gas holder —10,000,000 cubic foot capacity.

Its crown, so smoothly rounded—and over an acre in area—is welded, inside and out, to tolerances so small that the assembly looks like a commercial flanged and dished head. Why? To insure perfect drainage at all times and to eliminate water pockets that are the prime factors in starting corrosion.

Such safeguards are typical of the plus values built into every Stacey Brothers holder. They're both the result—and the cause—of our unsurpassed record of experience in All-Welded Gas Holders. We've not only built the largest all-welded wet-seal holder, but we've built *more than any other company*. Since we first introduced the famous All-Welded Panel construction, now accepted as a standard in the industry, we've built 77 in sizes ranging from 100,000 cubic feet to 10,000,000 cubic feet—and an even greater number of the smaller sizes.

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One of the Dresser Industries
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ALL-WELDED GAS HOLDERS

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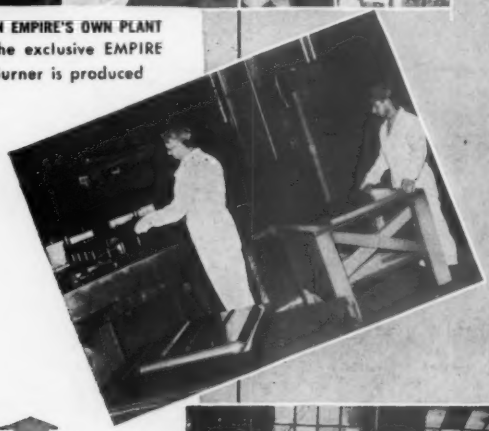

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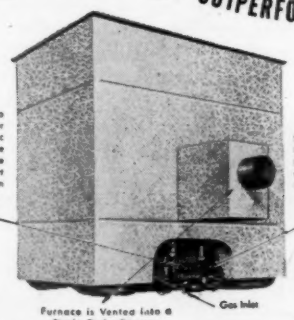
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BELLEVILLE, ILLINOIS

RERS OF GAS HEATING AND COOKING

DECEMBER
1948

AMERICAN
GAS JOURNAL

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NO. 6

Round Table Conferences of Southern Gas Association

Round Table Conferences, so popular with the Southern Gas Association, enable the exchange of practical information in an informal way on a wide variety of problems encountered in the gas industry. While summary reports on all such conferences are available to all members of the S.G.A. we offer herewith some of those pertaining to pipeline operation and to commercial sales. Mr. Fretwell, on the latter subject, points out the challenge of electric competition which must be met by aggressive sales and service on gas equipment.—Ed.

CHAIRMAN L. J. Fretwell, sponsor of the conference,* opened the discussion with the statement "Gas has rightly become the dominant fuel for commercial cooking, baking, water heating and other commercial processes. This load became ours principally because of the definite advantages of gas over solid and liquid fuels as well as the excellent promotional job done by gas utilities. Today this valuable commercial load is being challenged by some competitors who would like to obtain a major share of this business. As you know, this new competition does not come from solid or liquid fuels but from electricity. Nationally, through advertising sponsored principally by manufacturers and electric utilities, our commercial customers are being told daily that there is a newer and a better fuel. We know this is not true. If we, however, permit ourselves to become complacent and do not aggressively sell and service commercial gas equipment, we may find that this advantage in fuel superiority will be outweighed by more aggressive sales on the part of our competition."

He further stated that the general purposes of the round table conferences were as follows:

1. **To determine the most effective means of maintaining and increasing our valuable commercial gas load.**
2. **To determine if competition is endeavoring to secure this load as as well as discussing means and methods of combating this competition.**

* *Held October 1, 1948—Dallas, Texas.*

Extent of Competition

Most of the gas company representatives who were present believed that the major competition to our gas load at this time was from small counter electric appliances. The seriousness of this was emphasized as through the sale of these small counter appliances competition was obtaining a foothold and would continually strive to obtain additional business, step by step. It was the consensus of opinion that the competitors were making a definite bid for the commercial cooking load and that definite steps should be taken to secure this load for gas. One of those present charged the gas companies with complacency and made the statement that real electric competition for heavy duty equipment already is a fact. The following statistics were presented to prove this point:

1. **Hot Point alone sold $300,000 of heavy duty equipment within the past year in Texas.**
2. **Throughout the south, electric counter-equipment and deep fat fryers are being sold in quantity.**
3. **Electric bake ovens and bread and roll warmers are being installed.**
4. **Cafeteria chains such as Morrisons are installing and considering further installations of all electric equipment.**
5. **3600 domestic electric ranges have been installed in Birmingham, Alabama.**
6. **There now are 5,000,000 electric ranges in use as compared to 24,000,000 gas ranges. 1,500,000 electric ranges were sold in 1947 as compared to 2,500,000 gas ranges.**
7. **Hot Point production of electric ranges will be 600,000 in 1948.**

Another stated that there was a need for actual comparative operating cost data for gas and electric commercial equipment and gave some details of the installation now in operation at S.M.U. to develop this type of data. The need of a better gas advertising job was further stressed, as was the need for better sales tools from the various manufacturers.

Dealer Cooperation

In discussing this subject a definite need for dealer cooperation and for dealer supervision was expressed, the latter to insure that only top quality gas merchandise will be sold. Dealer cooperation varied in extent with the various gas companies represented. It was generally conceded that no specific program could be established as the best for dealer cooperation, but rather that each gas company should determine the most effective means of obtaining the maximum benefits from whatever dealer cooperation program would be most expedient in its territory.

Dealers should be educated to the obvious fact that kitchens of the commercial establishments should be thoroughly equipped with the most modern kitchen equipment which would be adequate for the proper preparation and serving of food. *As the profit of the average restaurant is determined in the kitchen, it was emphasized that kitchen planning and layout was even more important than dining room design and arrangement.*

Training Specialty Commercial Sales Engineers and Training Specialty Service Representatives

It was the belief of those in attendance that to handle properly the commercial sales and engineering required, it would be necessary to employ or train a commercial sales engineer. This was necessary because the average domestic salesman was not familiar with, or qualified to provide the sales and engineering needed for commercial work. It was also stressed that embryo commercial sales representatives would require a long period of continuous study and training.

Best Current Sales Practices

1. **Our representatives should learn the customers' business.**
2. **Have periodic campaigns to stress types of equipment.**
3. **Make surveys of the condition of customers' equipment and follow through with sales of replacement parts and unit replacement of worn out or obsolete equipment.**
4. **Have salesmen make complete coverage of all customers in their territory.**
5. **Use sales aids such as "Cooking for Profits," etc.**
6. **Work with and participate in meetings of restaurant and hotel associations, schools, etc.**

Sales Promotional Materials

Use "Cooking for Profit"; advertise in trade magazines, use maintenance charts, etc. Try to get a personal touch in local advertising.

Sizing Water Heaters*

The commercial water heating load for restaurant operation was estimated to comprise from 50 to 65% of the total gas load in a modern restaurant. It was also estimated that the average restaurant at the present time was woefully lacking in hot water supply for washing and sterilization purposes. The sale of adequate water heating equipment for restaurants would, therefore, afford an excellent means of increasing the gas companies' commercial revenue as well as rendering the customer and the eating public a good service.

Gas water heaters for restaurant use should be sized on peak requirements. The American Gas Association is compiling up-to-date data on sizing water heaters for restaurant use, and it was recommended that this information be obtained by member companies for their commercial gas water heating sales.

As a means of assisting in sizing water heaters properly, a suggestion sheet was passed out to all present at the meeting. This pamphlet was entitled "Suggestions for Determining Hot Water Requirements for Restaurants."

Correct Volume and Correct Pressure

We cannot expect good gas appliance performance if the gas piping is inadequate. The companies should assist the customer in selecting the proper size pipe and due consideration should be given to probable additional load being installed later. Gas appliance regulators should not be considered a cure-all, but should be used with care. They cannot manufacture gas.

Plans for Commercial Activities in 1949 S.G.A. Convention

Plans were discussed for the Commercial program to be given at the 1949 S.G.A. Convention in Biloxi. John Haverkamp, who will be sponsor for the Convention Commercial program outlined some suggestions for the proposed program. Mr. Haverkamp was complimented on the excellent subject matter suggested, and he will proceed with the development of this program, utilizing the general comments and recommendations of those present.

** We refer our readers to the series of charts by MacKay, published in American Gas Journal, October 1948, pages 35-38. —Ed.*

Gas Pipeline Operating Practices and Problems

Hydrate Control

Depth of Pipe Lines to Offset Ground Temperature Fluctuation: The discussion brought out that depth of pipe lines includes a range of from 24 inches in the Gulf Coast area, 36 inches in the Carthage area, to 48 inches in the Texas Panhandle. It was also pointed out that for the purpose of hydrate control, a definite relationship exists between the depth of the pipe line and the pressure of the line. Also, when gas and distillate are connected in the same line, smaller lines with a high velocity flow tend to keep the liquids swept out of low spots, thereby reducing possible hydrate formation points. One company operating in Indiana, Ohio and West Virginia, reported that when cutting pressure from 600 to 200 pounds, gas temperature was lowered to seven degrees and moisture from the ground in several instances had made a 12 inch coating of frost around the outside of the pipe which lifted the ground and in several instances caused damage to highways.

Number and Location of Indirect Heaters: It was reported that in the Carthage area, heaters are generally spaced two and a half to three miles apart. In another area where pipe is not buried below the frost line, heaters are spaced about one-half mile apart on the basis of one million BTU input per one-half mile section of four-inch line carrying 1,000 to 1,500 pounds pressure. Among other ideas presented was the use of a two-stage heater for heating gas after each reduction of pressure. Also reported was the use of a bottom-hole choke where volumes are relatively constant. This resulted in approximately reservoir temperature at the wellhead. Another company reported that they injected methanol in a line before turning in the gas, thereby preventing hydrate formation until the heaters take effect. It was pointed out that alcohol and methanol, though effective in hydrate control, are uneconomical when used in very large quantities. Ammonia was also considered good for hydrate

control provided the gas was completely free from carbon dioxide so that gas ammonium carbonate would not form and plug the lines. It was pointed out also that ammonia was especially good for thawing drips.

Dehydration Plant Practices: Several companies reported the use of the National Tank Company's package type dehydrator. It was pointed out that low inlet gas temperature of 60 to 75 degrees was an important factor in obtaining high efficiency from this unit. The Rossiter Separator, a small separator operating on the centrifugal principle, was reported to have a better than average efficiency. One company has ordered several of these separators for operation on their transmission lines.

Among other ideas discussed was that of placing a large separator ahead of the small unit separator to catch any slugs of liquid. It was also brought out that the Magnolia Petroleum Company has recently developed a new desiccant known as "Sovabeads" but none of the companies represented had as yet used this product.

Corrosion Control

Pipe Coatings: In discussion of coatings it was brought out that Somastic coating had been used with a one and one-half inch cement coating in place of river clamps. The cement is applied with the same type of equipment as used for Somastic coating. In salt water, it was reported, barnacles will drill through a five-eighths inch coating, lay their eggs next to the metal pipe and when new barnacles develop, the coating is lifted up. It was also mentioned that barnacles did not attack lines covered with mud and that in fresh water, mussels sometimes attack a line in a manner similar to barnacles. In using a Holiday detector for testing Somastic coating, the voltage should be 25,000 to 35,000 volts.

Fibreglass which can be used with enamel, Kraft paper, felt or in any combination, gives additional strength to the coating, Fibreglass can be applied with wrapping machines but uniformity of glass, rolls, and spindle sizes is important for satisfactory application. Fibreglass is not too satisfactory for patching.

Grease coating is only satisfactory when used in continuously wet ground and on hot lines in compressor stations.

Cathodic Protection: Cathodic protection by means of rectifiers is in most cases used where power is available and magnesium and zinc anodes in all other locations where protection is required. One company reported they installed an anode each time a corrosion leak is repaired.

Pipe Line Operating and Maintenance Practices

Welding: A discussion of welding practices brought out that high carbon steel No. 5 rod should be used for stringer bead and the No. 85 rod for other beads. Pressure welding was generally only satisfactory when the weld surface was perfectly clean. Another interesting point was the fact that welders' stencils set up stresses and caused pipe failure. It was reported that the use of X-ray for testing welds, with ten per cent of the welds being tested, gave very satisfactory results.

Damage Settlements: One company stated that they attempted to settle all damage claims through their district superintendents but when such was not successful, a claims man from the main office took over. Another company reported that they kept a claims man ahead of the pipe line crew and another behind the crew to settle all claims.

Right of Way: Most companies represented reported that they did not allow lakes or permanent structures to be built on pipe line right of way. One company reported a successful injunction to prevent the building of a permanent structure over their right of way.

Miscellaneous: In discussing slack loops, it was reported that three slack loops with an open end every 4,000 feet, were desirable and that tie-ins were made in the early morning. One company reported that they had permanently installed "pig traps" on their lines and with this installation they can run "pigs" daily without shutting down. This company reported excellent results with increased efficiency.

Compressor Operating and Maintenance Practices

Adequate Indicator for Taking Cards on Gas Compressor Cylinders of Angle Engines: The Bacharach Industrial Instrument Company can furnish a chronomatic drum which can be attached to standard Bacharach indicator. This drum is spring actuated. When the speed indicator shows the correct speed of drum rotation the compressor card is taken. This method of indicating compressor cylinders on high speed engines has been proved fairly satisfactory.

Methods of Balancing Power Cylinders on Two Stroke Cycle Gas Engines: By using an indicator and taking pull cards on the power cylinders, the compression of the cylinders may be balanced. The exhaust temperatures of the cylinders may also be used to check the balance of the cylinders. One method recommended by one of the engine manufacturers is to mark the throttle on the governor, pull the wires on each cylinder individually and note the point at which the throttle rests with each cylinder not firing. By regulating the gas valves until the throttle rests at the same position with each cylinder out one at a time, the engine will be balanced.

Oil Filters: Hilco and Honan-Crane oil filters have proved satisfactory on two stroke cycle gas engines with Fuller's earth as filtering material. Detergent oils were used by one company where Fuller's earth was used as a filtering material and proved satisfactory; however, filter manufacturers recommend that cellulose filtering material be used in filtering detergent oils

Temperature of Oil and Water Two Stroke Cycle Engines: The jacket water temperature is kept at 145 to 150 degrees F. entering the engines and 155 to 160 degrees leaving the engine. The temperature of the oil from the engine is kept at 140 to 145 degrees, which will keep the piston temperature slightly less than the cylinder temperature and prevent the pistons from seizing in the cylinders.

Uses for Bakelite or Micarta: Rings or valve plates of Bakelite are now made to stand temperatures up to 450 degrees F. Bakelite compressor valves are being used satisfactorily; they do not wear the valve seats as much as steel plates. Bakelite compressor piston rings have also proved satisfactory and have shown much longer life than cast iron rings. It was also pointed out that Bakelite compressor rod packing has a longer life than that of cast iron packing where dirt is encountered in the gas.

Sundry

The conference concluded with a discussion of pay differentials between supervisors and the highest paid non-exempt personnel and personnel practices relating to cadet or junior engineers.

It was the consensus of the group present that this first Transmission Round Table Conference was of considerable practical benefit to all in attendance and that in the future two such conferences should be held each year.

High BTU Gas for Peak Shaving

By

Geo. T. Bentley,

Superintendent of Production
Michigan Consolidated Gas Company

THE PURPOSE of this paper is to present for your consideration some of the experiences at Detroit during the last winter in the production of High Btu Oil Gas for augmenting the supply of natural gas during the winter peak load periods.

By High Btu Oil Gas is meant gas produced by cracking oil in heated checker chambers and the dilution of the cracked oil gas with combustion gas, producer gas or blue gas to a heating value and specific gravity suitable to meet local conditions.

Much has been said and written in recent years about the production and use of High Btu manufactured gas as a substitute for natural gas and to avoid repetition reference is made to some of the reports and papers presented before the Technical Section of the American Gas Association. Copies of these reports are available through its Headquarters in New York.

1. Report of the High Btu Gas Sub-Committee presented at the Joint Production and Chemical Committee Conferences in New York, June 6-7, 1944. This report in Part V contains a bibliography covering the meeting of peak loads in natural gas properties. It includes a section on High Btu Manufactured Gases listing forty separate papers and reports and covering many phases of high Btu Gas Production.

2. In 1946 the above Sub-Committee presented a report showing the production for all purposes of peak load gas during the years 1944 and 1945 divided into processes to cover Liquefied Petroleum Gas, Modified water gas process using solid generator fuel, Modified water gas process using liquid generator fuel and oil gas and reformed refinery gas processes.

3. At the Joint Meeting of the Production and Chemical Committee of the A.G.A. 1947, Mr. R. J. Chambers presented a paper on the Twin Generator Oil Gas Process for production of High Btu Gas* covering experience in Buffalo, New York, with one year's operation of a standard water gas set converted to twin generator oil gas operation.

4. At the 1948 Meeting of the above committees two papers were presented covering High Btu gas manufacture.

Mr. J. P. Stephens presented a paper on Equipment and Processes for Manufacturing Higher Btu Gases† in which various modifications of standard water gas sets to produce higher thermal value gases are discussed and at the same conference Mr. Frank P. Lamb presented a paper entitled "High Btu Oil Gas Production." This paper covered a modification of a standard water gas set in which the generator was used as a combustion chamber by installing an oil burner in the coaling hole, covering the grates with refractory and removing the Back Run Pine.

Detroit Procedure

From 1936 to 1947 at Detroit the High Btu Oil Gas requirements for supplementing the natural gas supply were met by producing gas on standard water gas machines converted to oil gas manufacture with coke as fuel in the manner described in previous papers on the subject.

During the winter 1946-47 it was necessary to operate the converted coke fired machines for a prolonged period at full load, the total production for the winter being approximately 3,760,000 M cubic feet.

It was found that with prolonged peak load operation coke firing produced many very difficult problems. Good coke was very scarce and difficult to obtain in the quantities required. Plant operating crews built up with two new men for every old timer were not skilled in such labor as clinkering fires and handling bulk materials such as coke and clinker and were generally unable to do the hard physical labor involved. Fires were not clinkered as frequently as desirable resulting in large side clinker developments in the generators and the inexperienced crews were unable to efficiently remove side clinkers resulting in many hours operation with poor fire conditions.

In making High Btu Gas very little through fire steam could be used during the make period since low heating value blue gas can be used in only limited amounts mixed with the cracked oil gas and still obtain desired heating value and burning characteristics. The amount of steam which can be used in the blow part of the cycle is also limited by combustion considerations. Consequently an extremely high fuel bed temperature was experienced. The high temperature and slag erosion destroyed fire clay generator linings in about four days to a week. Silicon Carbide linings had a life of 600 to 800 operating hours. Machine outages for relining generators became a serious problem.

The high temperatures in the fuel bed and poor clinkering allowed large amounts of ash either in solid or volatized form to be carried into the carburetter and superheater checker chambers where it deposited in the checker flues. This ash mixed with residual carbon from the oil cracking quickly stopped flues requiring burning out or renewal of the checkers after only a relatively few days.

The generally poor operating condition of the machines due to clinker in the fires, blocked checker flues and irregular temperature control produced considerable under-cracking and over-cracking of the oil. With gas oils frequent blocking of wash boxes occurred and with naphthas and crude kerosenes uncracked highly volatile oil was carried in the gas to the condensers where it was removed with tar and water to float on the surface of the tar separators usually emulsified with carbon and water. This volatile oil presented a difficult problem of removal and in two cases resulted in near disastrous fires which missed destroying the plant in which they occurred by fortuitous circumstances. This emulsion problem was aggravated when using naphtha compared to gas oil.

Oil Firing

From the above recitation of operating difficulties it should be clear that some measures were necessary to avoid a repetition of the trials and tribulations of that winter. Investigation clearly pointed to oil burning for heating the machines as a solution. It appeared certain that oil heating of the sets would eliminate or reduce the major part of our problems including an unfavorable coke market, solid fuel handling, clinker-

* *See American Gas Journal, July 1947, p. 42.—Ed.*

† *See American Gas Journal, July 1948, p. 15.—Ed.*

ing of gas machines, ash removal, frequent major refractory repairs, frequent wash box cleaning and volatile oil removal from separators.

The first conversion to oil firing was made on four standard 11′ water gas sets early in 1947. The dust trap tee between the generator and carburetter was dropped off. A plate was put over the side carburetter inlet flange and was insulated inside with fire brick. An oil burner of home manufacture was inserted through the above plate extending to the center of the carburetter and the nozzle made at an angle to look down. The normal secondary air connection was extended to admit the air supply through the above plate. A steam line was connected to this plate. The generator was thus disconnected and not used.

The improvised oil fired machines operated quite well for the remainder of the winter but the burners in the position in which they were located proved hard to light and as designed and installed would not satisfactorily burn any oils except of a light volatile nature such as naphtha or gasoline without excessive smoke and local overheating. The arrangement for mixing air with the atomized oil from the burner was unsatisfactory.

An improved single generator conversion using the top oil spray opening of the carburetter for insertion of the oil burner, air and steam was designed and during the summer of 1947 ten of the 11′ standard sets in Detroit were converted to oil firing using two shells i.e. one generator and one superheater for each set in series, the old generator being disconnected. Seven standard 11′ sets were converted to the twin generator oil fired process as described in Mr. R. J. Chambers paper previously mentioned.

With the machines converted to oil firing supplemented by a small amount of gas made in the remaining coke fired sets the very large supplemental gas requirement for the winter of 1947-1948 was successfully met. The last pages of this report show data covering the 1947-1948 winter production and also a sketch of the method of converting a standard water gas set to a single generator unit.

Following I will discuss some of the operating experiences of last winter.

Oil Burners

By test and experience it was found that an atomizing type burner with an internal steam pipe and concentric external oil pipe so arranged at the head that the steam will atomize the oil in a flat cone was best suited to generator heating. With this type burner combustion is completed in a limited space and a wide variety of fuel oils may be used. It is important that the air supply enter parallel to the burner surrounding it. The air should enter at quite high velocity so that intimate mixing of the air and atomized oil takes place close to the burner tip. The steam supply to the burner should be dry and at a pressure of 50 to 100 psi. The oil pressure may be low, just enough to obtain the desired rate of admission but must be uniform. The head to the burner should be adjustable to permit shortening or lengthening the flame cone. Oil strainers should be installed at the pumps, at the meters to the burners and should be a type readily cleaned. Dirt, lint and other solid matter can interrupt operation seriously if permitted in the burner oil system. Residual oil on burners will carbonize and build up on burner tips. Burners should be frequently blown out with steam and taken out for cleaning whenever a set is shut down. A separate fuel oil system including a fuel oil storage tank, pressure pumps, strainers and piping is desirable to permit using other materials than cracking stock for fuel and to maintain a steady uniform pressure at the burners. The system should be designed to handle up to ten gpm. per burner. Provisions for heating the oil in the supply tank should be installed if the use of heavy oil or tar is contemplated.

Burner Fuel Oil

Almost any fluid hydrocarbon can be used for fuel. Oils in range from Naphtha to No. 5 fuel oil and including waste oil picked up from automobile service stations were used. It is believed that water gas tar can be used successfully based on tests made and from experience in other cities.

Air Supply

Blowers normally used in water gas operations are usually adequate for oil firing. About 2,000 cu. ft. of air is required per gallon of burner oil. The pressure may be low but should be uniform. A single generator machine with an 11′ diameter generator requires about 12,000 cfm. and a twin generator machine about 22,000 cfm.

Checkerbrick

Oil firing does not deteriorate checkerbrick seriously and a good Missouri first quality brick will give satisfactory life. The generator top five courses will usually give 1,000 to 16,000 hours life, brick below the top five courses much greater. Faulty heat distribution may plug portions of the generator flues in a short time with carbon. Proper burner operation will avoid this. The spacing of checkers is a debatable question. Sets have been operated with 1½″ generator flue spacing and some with 3″ flues. It has been difficult to observe any difference in overall results. It is indicated that spacing can be increased as the API gravity of the oil increases. A formula of 12 gallons of oil admitted per run per 1,000 checkerbrick in all shells appears to be substantially correct.

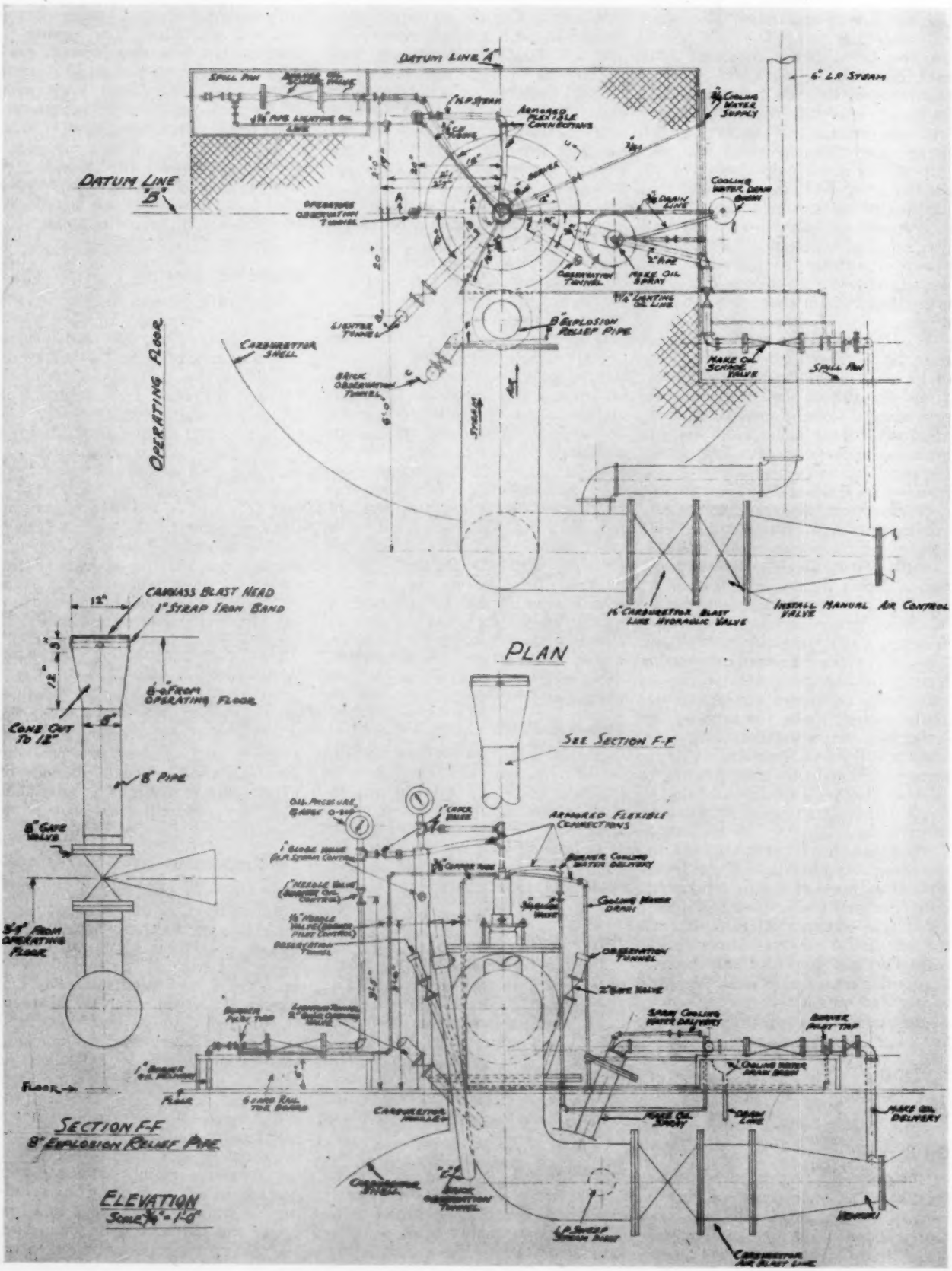
Oil for Gas Making

Care must be used in selecting the gas making oil used. Blended products which are generally available in the market give unfavorable results due to the materials used in blending having different temperatures at which they crack most efficiently. Oil high in carbon residue or unsaturated hydrocarbons is also unfavorable. Although by using excess air for combustion it is possible to burn out carbon deposited in the checkers unfortunately some of the excess carbon during the make period passes into the wash boxes and appears in the tar or as oil-carbon-water emulsion on the surface of the separators. During last winter's operation materials ranging from naphtha through 32° API gas oil were used successfully. In every case contracts were based on a straight run product. It must be emphasized that with normal gas oils the tar volume produced is the greatest and where tar handling facilities are inadequate the use of lighter oils or naphtha is advisable. The tar produced when naphtha is used is practically negligible.

Tar Production

34-36° API Gas Oils produce approximately 15% of their volume of tar. This means that when using 10 gallons of oil per M cu. ft. of gas there is a residual of 1.5 gallons of tar. On a high production day last winter at Detroit when 60 MM cu. ft. of high Btu gas was produced if all gas oil were used for cracking there would also be 90,000 gallons of tar on a dry basis to separate, dehydrate and dispose of. The tar produced from oil fired machines has a satisfactory fluidity. It contains approximately 10% free carbon. The tar separates readily with a water content of 40 to 50%. On standing the water content drops to a low figure and the tar can in some cases be sold without dehydration after

Typical Conversion of Standard Water Gas Machine To Single Generator Oil Burning Process



several months of settling.

There is a residual light tar and finely divided carbon which are removed from the gas during condensation. These materials appear in the separators emulsified with water and floating. The emulsion is of water in tar type, the amount of water is from 85 to 95% of the emulsion with carbon and tar in about equal proportions. The emulsion forms in quite large volumes and irrespective of the type of oil used. The volume however is greater from those oils producing little or no tar such as naphtha.

This emulsion presents a serious problem in disposition. If the plant has adequate tank capacity so that the emulsion after removal from separators by skimming can remain undisturbed for several days a combination of heating and chemical treatment (Amine 220 made by Carbide and Carbon Chemicals Corporation was effective) the emulsion will break down freeing the tar. Two or three tanks with sufficient capacity to hold two or more days production each will permit adequate capacity for breaking the emulsion.

In a plant designed to produce water gas with heating values under 600 Btu the tar separating and dehydrating facilities will probably be inadequate if the plant is converted for High Btu gas production. Consideration in this case should be given to increasing the size and efficiency of separators and additional wet tar storage facilities provided.

In areas where there is emphasis placed on pollution of streams or sewage treatment plants the presence of emulsions, tar or dissolved phenols or oils in plant effluents may demand that special treatment be used to reduce effluent pollution constituents.

Gas Heating Value, Specific Gravity and Analysis

The analysis, average Btu per cubic foot and specific gravity of High Btu gas made in Detroit last winter are shown in the tables on the last pages of this report.

Assuming that the temperature conditions in the checkerbrick, rate of oil admission and condition of the set are uniform and normal the heating value of the oil gas produced will be quite uniform at between 1,400 to 1,500 Btu per cubic foot depending on the cracking temperature, oil used and other variables. To produce a gas of lower heating value dilution with flue gas or other low heating value gases is necessary. In the Detroit plants a combination of air purge and blow run is used. After each oil admission period and steam purge the air valve is opened prior to opening the stack cap. It has been found that this air quickly combines with any residual oil or carbon in the set and as these residual carbons are consumed the oxygen content of the gas entering the wash box increases. Oxygen content entering the wash boxes in excess of about 5% is avoided and consequently it is found that the purge air admission time cannot exceed about 3 to 4% of a four minute cycle. The heating value of the gas made with the above amount of dilution will be about 1,050 Btu per cubic foot. To reduce the heating value further it has been found practical to close the stack cap before the oil burners are shut off and use products of combustion for further dilution. The burners continue to operate efficiently under the increased pressure conditions following the stack cap closing and a gas free of oxygen is produced. Experience shows that about 3 to 7% of a four minute cycle devoted to producing this combustion gas will furnish sufficient added dilution to reduce the gas produced to about 950 Btu cubic foot. This 950 Btu appears to be that which is satisfactorily interchangeable with the natural gas used in Detroit. It has a specific gravity of about .8 to .85. About 40% of this gas can be mixed with Detroit natural gas without materially increasing customer complaints. Much larger proportions have been distributed when necessity arose but customer difficulties increase as the percentage of mixture increased over 40%.

The heating value of the gas and its specific gravity may also be increased or decreased by raising or lowering the checker temperatures. There are limits to such variations due to lowered efficiency of cracking. The appearance of uncracked oils in condensing or of excess carbon in wash boxes and condensers are indicative of too low or too high cracking temperatures.

Stability of the Gas

Like all cracked oil gases a long series of hydrocarbons are present in the mixture. Many of these hydrocarbons have a relatively low vapor pressure and will condense to liquid under suitable pressure, temperature conditions. They will also be absorbed in liquids which are not saturated with these hydrocarbons. Compression and cooling will cause a decrease in the gas heating value of an amount depending on the degree of compression and cooling. High Btu oil gas may be stored in a water sealed holder without excessive loss of heating value but in general it is well to move it rapidly and mix it with the natural gas or distribute it. Some loss of both light oil and water will occur in the distribution system as in any manufactured gas operation and an increase in drip pumping may be expected. Experience has shown that unmixed High Btu gas should not be stored in a tar sealed holder unless provisions are made to promptly remove the absorbed light oils from the tar sealant. High Btu gas placed in a tar sealed holder may lose as much as 150 Btu in a few hours. Continued use of a tar sealed holder without active removal of the light oils from the tar may produce a combustible gas air mixture above the piston through rapid evaporation of tar absorbed light oils.

Machine Capacities

Experience at Detroit has shown that the output in gas with Btu per cubic foot between 900 to 1,000 is about 5,000 MCF per day for 11′ standard water gas machines converted to twin generator process. The single generator conversions using the same size standard sets will produce about 3,200 MCF per day.

Limitation of production in the case of the twin generators is blower capacity and set pressures during the oil admission period. Standard machines with small wash boxes will require larger ones to reduce differential pressures and permit capacities shown. Limitation for the single generator sets is over-heating in the top of the generators. It has been a policy for safety reasons to limit the pressure in the top of the generator during the oil admission to the external air line pressure. Greater volumes of gas can be produced when naphtha or similar volatile materials are cracked compared to normal gas oils. The thermal output of either type of conversion compared to the amount of High Btu water gas which standard coke fired water gas machines will produce is of great significance in considering this type of operation for supplementing natural gas volumes.

Safety Precautions

It has become increasingly difficult to obtain gas oils with high flash fire points in recent years and the use of low flash products may become necessary. The same safety precautions must be provided when low flash oils are to be used as ap-

Typical °API of oils used during the winter for gas making and heating:

Gas Oil	34 to 41.
Naphtha	60 to 68.5
Illinois Crude Oil	37.2
Kerosene	43.6
No. 5 Fuel Oil	16.0
Waste Oil	29.7

Representative Machine Conditions

Generator temps. °F

One side	1,450 to 1,600
Opposite side	1,550 to 1,650

Superheater temps. °F

Base	1,500 to 1,600
Top	1,400 to 1,500

Air Rates Cfm per generator

Blast	10,000 to 12,000
Purge & Blow Run	8,000 to 10,000

(depending upon machine back pressure. Air rate setting not changed from blast rate.)

Stack Analysis

CO_2%	12.0 to 15.0
O_2	0. to .6

plies to refineries and bulk gasoline stations. Top unloading of railroad cars should be practiced. If storage of Class I & II liquids is permitted in the plant area the tanks should be provided with safety devices usually prescribed in flammable liquid codes to include flash and flame arrester vents, explosion relief rupture plates, tight closed roofs, emergency fusible link bottom shut off valves and earth or concrete dykes. Local regulations will govern any additional precautions. Pumps handling low flash liquids should be isolated from other plant structures and pump houses equipped with suitable fire protective devices. Rigid no smoking rules should be enforced in all areas where low flash liquids are handled and stored. Welding in these areas should be prohibited.

Lighting of oil burners in cold machines particularly if low flash oils are in use may be extremely hazardous. It cannot be too strongly emphasized that a fool proof procedure must be provided to insure against delayed ignition or developing of explosive atmospheres in machines. The procedure must then be exactly followed. In the Detroit conversion the use of multiple small pilots for igniting the main burner with several observation openings is provided. A written procedure is exactly followed in starting the cold set.

In conclusion it has been found

(Concluded on page 52)

SUMMARY OF HIGH BTU GAS RESULTS FOR WINTER SEASON 1947-1948

Month	*Gas Made Per MMCF*	*Coke Used Per MCF*	*Heating Oil Gal. per MCF*	*Make Oil Gal. per MCF*	*Total Gallons Per MCF*	*Average Btu/cu. ft. of Gas Produced*
Nov. 1947	191	—	—	—	11.61	943
Dec.	801	—	1.79	9.68	11.47	933
Jan. 1948	1,199	1.42	1.77	9.39	11.16	911
Feb.	910	7.57	1.44	8.58	10.02	874
Mar.	568	8.22	1.36	8.31	9.68	810
Apr.	19	24.05	.63	6.02	6.65	749

Note: Due to the shortage of oil during this winter it became necessary to utilize a stock of coke which was available. Increasing amounts of L.P. Air Gas made during the later months with its relatively high heating value permitted production of lower heating value oil gas and still distribute a mixture of the required Btu standard.

DATA FROM OPERATION JANUARY 4 TO 24 INCLUSIVE 1948 DURING A PERIOD OF MAXIMUM OPERATION WITH NO COKE

Station		*"A"*	*"B"*	*"J"*	*"RR"*	*Average or Total*
Hours of Operation	Single Shell	729.9	207.1	284.2	1216.7	2437.9
	Twin Shell	744.6	368.1	1093.3		2206.0
Oil used gals.		2,840,120	1,230,806	2,963,673	2,232,802	9,267,401

CYCLES (Representative) Total Time: 4 min.

	Single Generator	*Twin Generator*
Blast	50%	54%
Blow Run	6	5
Steam Purge	4	1
Make Run	33	30
Steam Purge	5	7
Steam and Air Purge	2	3

RESULTS STA.	*"A"*	*"B"*	*"J"*	*"RR"*	*Average or Total*
Gas Made Mcf	238,034	110,370	270,233	197,691	816,323
Make/ Machine Hour	161,428	191,865	196,165	162,477	175,777
Make Oil/Mcf	10.00	9.35	9.07	9.59	9.51
Burner Oil/Mcf	1.93	1.80	1.89	1.71	1.85
Total Oil/Mcf	11.93	11.15	10.96	11.30	11.36

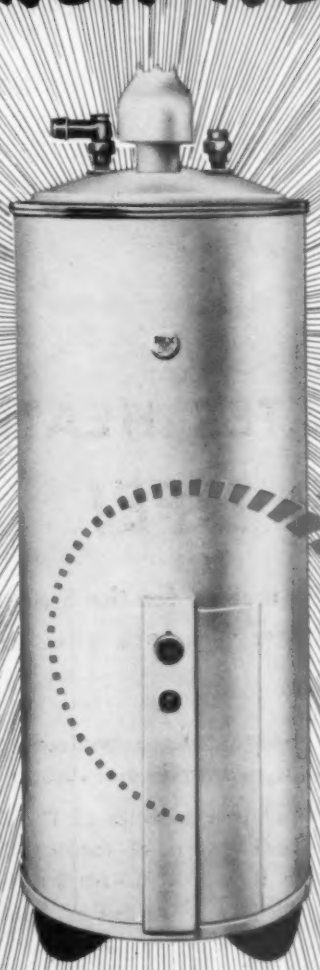
GAS ANALYSIS

CO_2	2.5	3.2	3.1/3	3.6
Ill	25.4	23.7	26.6	24.6
O_2	1.3	1.0	1.4	1.4
CO	1.2	1.4	1.3	1.2
H_2	18.3	18.4	16.9	15.7
CH_4	25.7	27.6	23.5	26.6
C_2H_6	2.9	3.2	2.9	3.6
N_2	22.7	21.5	24.1	23.3
Calc Btu	919	912	922	919
Obs Btu	916	926	925	914
Sp. Gr.	.79	.81	.86	.86

Make Oil Used During Month of January	83% Gas Oil 12% Naphtha 3% Kerosene	73% Gas Oil 27% Naphtha	44% Gas Oil 55% Naphtha 1% Fuel Oil	88% Naphtha 11% Gas Oil 1% Fuel Oil

During the above month the report noted that the following oils were used as burner fuel for set heating:—gas oil, naphtha, tar oil, kerosene, fuel oil, light tar, waste oil (recovered from automobile service stations) and coke.

the new REX "XL"



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There are no projecting parts; all functioning parts, the thermostat, the gas safety pilot, are concealed.

PRACTICAL TO USE: The temperature control knob enables the housewife to have hot water at almost any temperature she desires.

ECONOMICAL TO USE: Its low contour, its efficient insulation, its efficient burner make the REX "XL" the most economical water heater designed by REX engineers.

SAFE TO USE: A safety pilot that cuts-off all gas supply to the burner and pilot, and a Temperature and Pressure Relief Valve make the REX "XL" safe to use in any home.

BUILT TO LAST: Sturdy construction, a heavy, tested storage tank, "Elno" protected add to the life of this water heater.

EASY TO INSTALL: Its low compact design facilitates installation.

EASY TO SELL: Available in six sizes. There is a size to fit most any home. Moreover, because it has all the features the housewife demands.

THE CLEVELAND HEATER COMPANY

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GIVES YOUR WATER HEATERS *LONGER LIFE!*

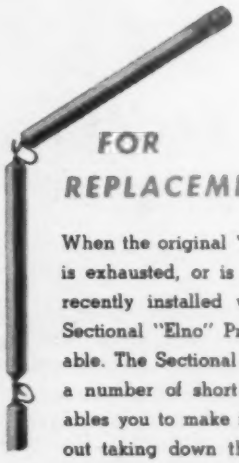
Insist on "Elno" Protection for the Storage Tank of the Water Heaters you sell.

"Elno" the anodic rod prevents the galvanized storage Tank of the water heater from corroding or rusting.

"Elno" The Magic Wand is a product of The Cleveland Heater Co., manufacturers of the well-known "Rex" Water Heaters, they now furnish this marvelous protector to fit any make water heater or range boiler.

There is a one-piece "Elno" Protector available with a fitting to match the water heater you sell.

Now you can tell your customers that the storage tank of the water heater you sell will last longer. Cash in on this new selling feature: "Elno" Protection. Your supply house carries "Elno" Protectors in stock. Look for the Trade Mark. If you want the story of Anodic Galvanized Tank Protection send for Facts Bulletin No. 102, Descriptive Circular and Prices.



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When the original "Elno" Protector is exhausted, or is to be added to recently installed water heater, a Sectional "Elno" Protector is available. The Sectional Type is made of a number of short sections, it enables you to make installation without taking down the storage tank; even with low headroom.

THE CLEVELAND HEATER COMPANY

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Katy Gas Cycling Plant

By
William T. Robertson, Design Engineer
and
H. N. Stamper, Asst. Chief Engineer
Humble Oil and Refining Co.

GAS CYCLING may be defined as an operation of producing gas from a gas reservoir, processing through a product extraction plant for recovery of desired liquefiable hydrocarbon fractions, and the compression of residue gas remaining after product extraction to reservoir pressure and injection wells into gas production reservoir for pressure maintenance and maximum recovery of original reservoir gas. In the majority of gas fields, it has been found that the recoverable hydrocarbons in the reservoir exist as a gas at reservoir pressure and temperature. If a reservoir is produced to the extent that there is a decline in reservoir pressure, a certain quantity of recoverable hydrocarbons will condense and be lost in the producing sand. By cycling operations, the reservoir pressure is maintained due to the return of plant residue gas to the producing formation. The pressure maintenance, therefore, prevents the loss of products which would otherwise occur due to pressure decline.

Plant Design

The Katy Gas Cycling Plant is one of the largest of its type in operation. It is designed to process 458 million cubic feet of gas per day from 33 producing wells, recovering 80% of the potential butanes and practically all of the pentane and heavier hydrocarbons. Approximately 400 million cubic feet of wet gas per day enter the high pressure absorbers, operating at 1800# per sq. inch. The absorber residue gas, around 388 million feet per day, is returned by gas engine compressor units to the 13 injection wells. The remaining plant capacity is utilized in the processing of gas for delivery to two sales transmission systems.

Extraction and fractionating facilities are installed to permit optimum recovery of the desired hydrocarbon fractions and segregation into various products for marketing. Under normal operations, the Plant processes an average of 458 m.c.f. of reservoir gas per day from which the following products are recovered: Methane-Ethane-Propane Mixture, Commercial Propane, Commercial Iso Butane, Commercial Normal Butane, Gasoline (72 octane to 91 octane aviation fuel) and Heavy Naphtha.

Construction and operation of the Katy Gas Cycling Plant, one of the largest plants of its type, located near Houston, Texas, was described in a paper presented at the fall meeting of The American Society of Mechanical Engineers, Portland, Oregon, Sept. 7-9, by William T. Robertson.

The plant is designed to process 458 million cubic feet of gas per day, from 33 producing wells. The products recovered are methane-ethane - propane mixture, commercial propane, commercial iso-butane, commercial normal butane, gasoline (72 octane motor fuel to 91 octane aviation fuel) and heavy naphtha.

Additional propane recovery units now being installed will increase the propane recovery from approximately 30% to 80% of the hydrocarbons contained in the gas.

Approximately 35 acreage holders in the Katy field are joint owners of the plant. Humble Oil & Refining Co. in 1941 was authorized to construct the plant and operate it.—Ed.

Field System

The gathering system is designed to take the gas from 33 producing wells, three of which are dual completions. The lines are sized for a maximum daily production of 20 million cubic feet from the edge wells and 25 million cubic feet from the other completions. The gathering system is designed for a working pressure of 2,700# per sq. inch at 130°F. Each producing well is equipped with a meter setting for metering the gas produced from each sand.

The injection field line system is designed so that approximately 50 million cubic feet can be delivered to each injection well with a maximum pressure drop of 100# between the compressors and the injection well heads. Of this pressure drop, about 25# is due to line losses at plant, expansion bends, meter settings and well head connections. All piping is constructed in accordance with A.S.A. Code for High Pressure Piping. The field lines are securely anchored at each end and between each expansion bend provided in the line. Expansion bends are also installed at the well heads to provide for expansion in the well casing. The injection system is designed for a working pressure of 3,500# per sq. inch at 175°F.

High Pressure Gas System Within Plant

The producing wells, at an average flow rate of 25 million cubic feet per day each, have a pressure at the well head of approximately 2,450# per sq. inch and a flowing temperature of 165°F. The wet gas arrives at the plant at a pressure of 2,200# per sq. inch and a temperature around 130°F. The gas to be processed in the high pressure absorbers and handled through the compressor unit for reinjection to the producing formation is first cooled in the high pressure cooling coils located in the cooling tower. Such cooling reduces the gas temperature from 135°F. to 90°F. at inlet plant pressure. After cooling, the gas is delivered to the 1800# system through two headers and pressure reducing regulators which control the absorber and compressor suction pressure at 1,800# per sq. inch. Before introducing the gas into the four 1,800# absorbers, it

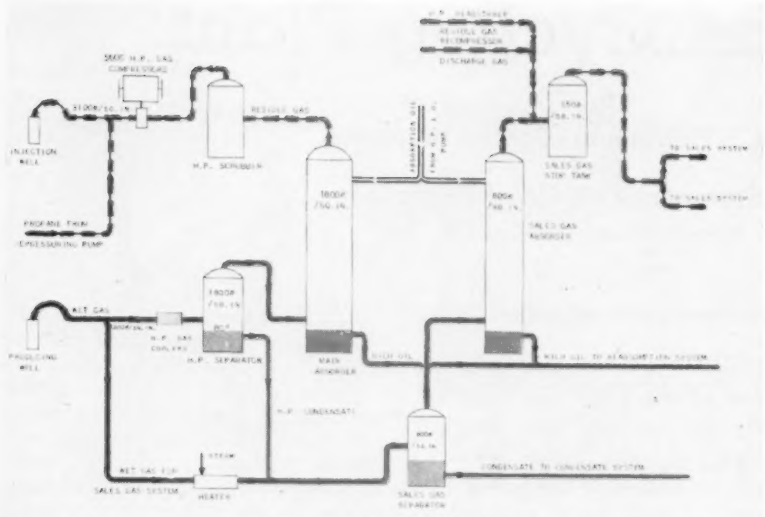


Figure 1A - HIGH PRESSURE GAS AND SALES GAS SYSTEMS

is passed through two separators in parallel to remove the liquid formed by previous cooling and pressure reduction. The discussion of the liquid flow will follow under "Condensate and Process System."

Gas from the separators operating at 1,800# per sq. inch is next delivered and equally distributed to absorbers operating in parallel. Sufficient absorption oil contacts the gas for the extraction at this point of approximately 80% of the butanes. The residue gas is then passed through two scrubbers in parallel operation where any large quantity of liquid that might be carried overhead from the absorbers, due to mechanical up-set, will be automatically collected and drained. The gas then goes into the compressors for delivery to the injection wells. All gas volumes referred to in this discussion are at a base pressure of 14.7# per sq. inch absolute and 60°F. temperature.

The compressor unit has 12,600 compressor h.p. The compressors are installed to deliver 388 million cubic feet per day of high pressure absorber residue gas to the injection system and wells at a suction pressure of 1,800# per sq. inch and a discharge pressure of 3,000# per sq. inch. A closed jacket cooling water system is provided for the unit, the make-up water being condensed steam from the power plant. Electric motor driven centrifugal pumps circulate the required amount of jacket cooling water.

Condensate System

A separate system is provided for processing the liquid formed by condensation and separated from the gas in the 1,800# and 800# sales gas separators.

The liquid separated in the 1,800# inlet gas separators is flashed into the sales gas separator, operating at 800# per sq. inch. This permits reabsorption of the flashed gases at optimum pressure and reduces the quantity of field wet gas required to supply the sales gas demand. The 800# separator liquid is further flashed in stages to 600, 200 and 35# per sq. inch, the flashed gases going to the reabsorbers at these respective pressures. In this manner, all of the flashed vapors are processed in the reabsorption system for the retention of the desired butanes. The liquid from the low pressure condensate flash tank is delivered by pump through heat exchangers, a preheater and into the condensate still operating at 45# per sq. inch. Sufficient stripping steam is introduced into the base of the still to effect the removal of all the 250°F. end point and lighter hydrocarbon fractions, the overhead vapors passing through a condenser where approximately 90% condensation is obtained. The product from the base of the condensate still is heat exchanged against the feed material and then delivered to storage as gasoline free distillate.

Distillation System

The primary purpose of the distillation system is to process the rich oil from the absorption unit, remove the desired gasoline fractions and provide a well stripped heavy absorption oil for recirculation to the absorption system. To accomplish this, it is necessary to operate a two still system.

The No. 1 Still operating at 90# per sq. inch is designed to remove the 250°F. end point gasoline product from the rich oil. This is accomplished by pumping the rich oil from the absorption system through heat exchangers and direct fired heaters to bring the temperature level to 530°F. Sufficient stripping steam effects the removal of the desired overhead fractions while a hot reflux controls the gasoline final boiling point. The liquid condensed from the overhead of this still provides the raw charge to the stabilizers.

The oil leaving the base of the No. 1 Still contains hydrocarbons boiling between 250°F. and 500°F. The No. 2 Still, operating at 5# per sq. inch, receives the oil feed for further processing at approximately 500°F. Sufficient stripping steam removes the heavy hydrocarbons and gives control on the initial boiling point of the absorption oil from the bottom of the still. The stripped absorption oil is next pumped through the heat exchangers and final oil coolers to the various absorbers. The overhead product is condensed and delivered to storage with the bottoms from the condensate still.

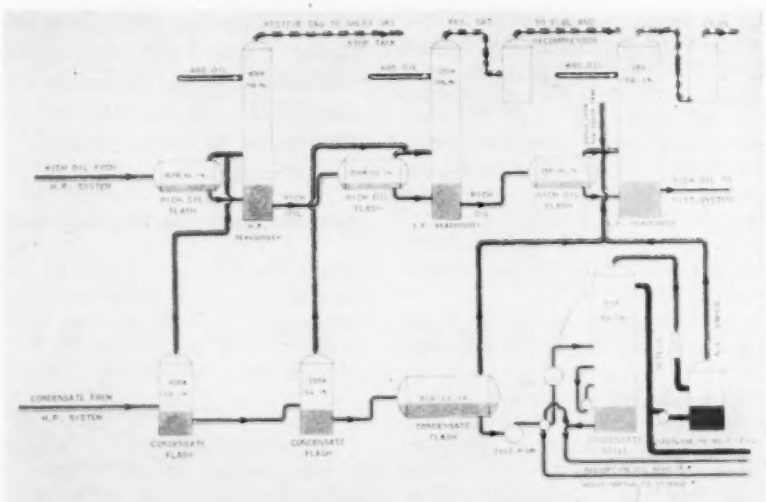


Figure 2A - REABSORPTION AND CONDENSATE SYSTEMS

The absorption oil for the sales gas absorbers and the high pressure reabsorbers is withdrawn as a side stream from the main high pressure lean oil pump. This pump, for delivering the oil to these absorbers, is a steam turbine driven centrifugal unit.

Steam and Power System

Steam: The steam and electric system for the Katy Gas Cycling Plant is unusual compared with most plants of this nature. In the plant design, it was decided to use steam and electrically driven centrifugal pumps where practical. The plant process requires approximately 235,000# of steam per hour at 250, 105 and 15# per sq. inch pressure and an electric power and lighting load of 2,500 KW.

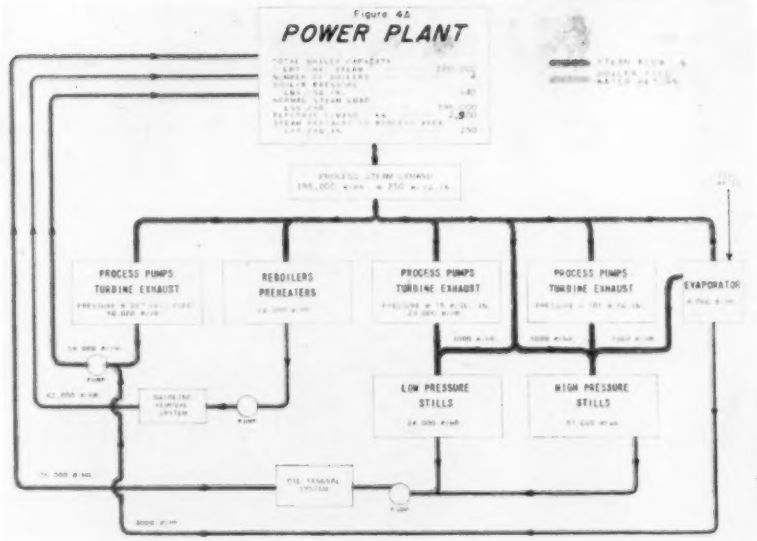
After analyzing the various power schemes, the most attractive was the generation of steam at a pressure of 600# per sq. inch, generating the required electrical load by back pressure steam turbine driven generators and staging the steam pressures down through the plant so that the total steam required for the generator drives balanced the requirements for process heating, stripping and pump drives. The "Flow Diagram," Figure 4A shows the arrangement in the power plant.

To meet the processing requirements of steam, four 700# working pressure B&W boilers are installed. Each boiler is designed to produce 70,000# per hour steam at 600# pressure and 675°F. temperature. The boilers are of the integral furnace type, completely water walled and equipped with forced and induced draft fans with stub stacks.

For the calculated electrical load of 2500 KW, there are installed two —2000 KW, 440 volt, 3 phase, 60 cycle, 3,600 r.p.m. turbo-generators. The turbines operate at 600# inlet steam pressure and throttle to 250# back pressure.

Steam from the 600# header is used to drive the generator and boiler feed pumps and turbines, the exhaust pressure from these turbines being maintained at 250 p.s.i. The exhaust steam at 250 p.s.i. is next utilized in the distillation unit process for heating, stripping and pump drives. The steam as utilized in these services is all condensed and returned to the deaerating heater for feed to the boilers.

There are 3 dual-drive centrifugal feed water pumps operating at 3,550 r.p.m. each, driven through a flexible coupling by a 150 h.p. motor at one end and by a steam turbine at the other end. An automatic regulating valve in the steam line to the three turbines divides the power input to the pumps between the turbines and motors for the purpose of controlling the steam pressure in the 250# exhaust header. Complete automatic combustion control equipment is installed on each boiler for maintaining pressure, forced draft, furnace draft and induced draft.



The distribution and utilization of the steam from the boiler house at a pressure of 250# per sq. inch is a most interesting feature. This is shown on "Power Plant Flow Sheet, Figure 4A." The turbines driving the fat oil pumps and depropanizer charge pumps are of the back pressure type, exhausting into the 105# steam header. The steam from the makeup evaporator also goes into this header. The 105# steam is next used in stripping as illustrated. The quantity of stripping steam required at 15# per sq. inch is 12,700# per hour. To provide this steam, the turbines driving the hot lean oil pump and recompressor, exhaust into a steam header operating at 15# p.s.i. The pressure in the 15# steam header is controlled by means of a pressure reducing regulator from the 105# system. Sufficient regulating and relief valve equipment is installed to prevent excessive pressure in any of the steam headers during either partial or full load operations.

Two centrifugal oil pumps delivering absorption oil to the high pressure absorbers are driven by a 2,000 h.p. steam turbine operating at 3,600 r.p.m. The inlet steam is at a pressure of 250# p.s.i. while the turbine exhaust steam is piped into a 2,800 sq. foot surface condenser operating under 4" of mercury back pressure. The exhaust steam from the turbine driving the liquid repressuring pump along with excess steam from the 15# steam header is also introduced into this surface condenser. The condensate from the condenser is returned by pump to the deaerating heater in the power plant.

The condensed steam from the various units of distillation equipment is returned to a steam condensate filter and separator system where any trace of oil or contamination is removed and the condensate returned by centrifugal pump to the deaerating heater in the power plant.

This method of operation assures practically total return of condensed steam for feed to the boilers. The approximate makeup requirement is 10,000# per hour.

Safety and Alarm System

The safety arrangement has been given careful study in the Katy Plant. In order to warn the plant operators of trouble in the system, an arrangement of alarm whistles is installed on the various vessels requiring special attention against adverse operating conditions. However, if the difficulty is beyond the operator's control, a separate set of safety controls will automatically shut down the major mechanical equipment, thus insuring protection for the personnel and equipment.

In conclusion, I wish to extend my appreciation to the Gas Division of the Humble Oil & Refining Company and especially to Mr. Frank G. Noble, Assistant Superintendent of the Gas Division, who gave me his valuable assistance in securing data and to the Management of the Company for permission to prepare and present this paper.

FIRST INSTANCE OF

GAS FILLED BALLOON IN BATTLE OF FAIR OAKS

Prof. Lowe Reconnoiters From "Intrepid"

Whatever its outcome the Battle of Fair Oaks is destined to loom large in the history of warfare for here today war took to the skies as a balloon filled with gas from a miniature gas works rode over the battlefield. Piloted by Prof. T. S. C. Lowe, the balloon "Intrepid" permitted reconnoitering of the opposing forces, and the shouting of information to the commanding officer.

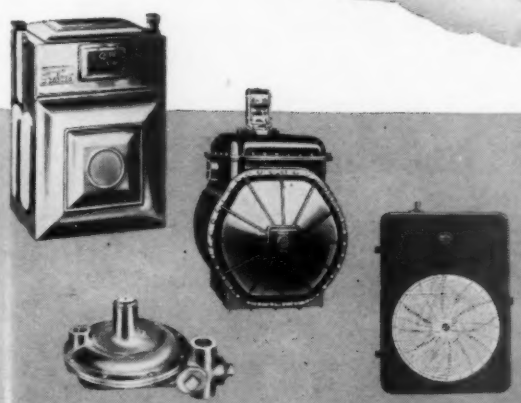
It is deemed possible that the future will see aerial craft playing an increasing part in the conduct of war, perhaps even dropping missles on the enemy to confound them.

During the War Between the States Prof. Lowe solved his distribution problem by carrying a gas works with him. But as the uses of gas grew and multiplied, distribution became more and more important as the vital link in gas service.

Upon the skill and devotion to duty of today's distribution engineers depends the steady flow of gas from gas wells and gas holders to over 21,000,000 customers.

Since the infant days of the industry, it has been the privilege of American Meter Company to work with the distribution engineers by providing accurate, dependable measurement. And as the industry looks ahead to years of even greater service to the Nation, American Meter Company pledges its research facilities and manufacturing skill to serve the gas industry.

AERIAL WARFARE



AMERICAN METER COMPANY

INCORPORATED (ESTABLISHED 1836)

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Pan American Gas Company's Texas City Gas Regulating Terminal

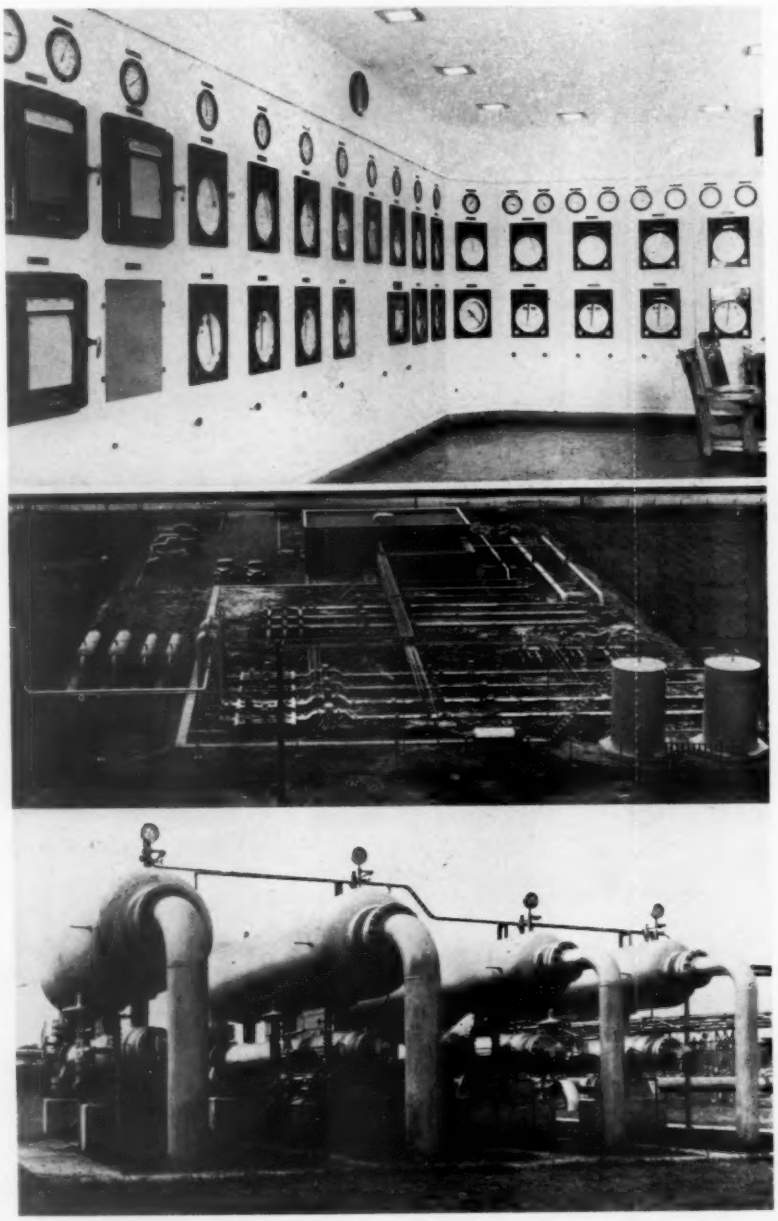
By
O. W. Fowler*

THE Pan American Gas Company purchases natural gas from the Chocolate Bayou Field, Brazoria County, and the Dickinson-Gillock Area, Galveston County. This natural gas is transported through a recently completed sixteen inch line from the Chocolate Bayou Field and two six inch lines from the Dickinson-Gillock Area, to Texas City where it is distributed to various customers, the principal ones being the Pan American Refining Corporation, Carbide and Carbon Chemicals Corporation, Tin Processing Corporation, Republic Oil Refining Company and Stone Oil Company.

In order to handle the expanding gas requirements of the Carbide and Carbon Chemicals Corporation plant and other industries at Texas City, Pan American Gas Company designed and constructed a new terminal with a daily capacity of 200,000 MCF to better serve the requirements of its Texas City customers.

Terminal Inlet Control Meter Runs

There are four inlet runs. The Chocolate Bayou flow is divided into two 12 inch inlet runs, each with a daily capacity of 75,000 MCF and the two Dickinson-Gillock inlet runs are each designed to handle 40,000 MCF daily, all at 600 pounds per square inch gauge. Each run has an inlet horizontal scrubber, heater bend, pressure reducing regulator, down stream scrubber, meter run, flow controller and pressure relief valves. The scrubbers have mist extractors and the inlet scrubber is equipped with a relief valve and automatic dump valve. The temperature of the gas below the pressure reducing regulators is thermostatically controlled by temperature regulators which regulate the steam to the heater bends. The heater bend steam jackets are equipped with relief valves to prevent gas from entering the plant steam lines in the event of a gas leak in one of the heater bends. Each of the Chocolate Bayou inlet meter runs has a four inch relief valve and the Dickinson-Gillock meter runs each have three inch relief valves which empty into a six inch vent line. The pressure on each of the inlet scrubbers and below the



PAN AMERICAN GAS COMPANY TEXAS CITY TERMINAL

Top:—Instrument panels in the control room.

Center:—A rear view of the terminal shows the general layout of surface equipment, with office containing the control room in the background.

Bottom:—Close-up of installation of large horizontal separators.

* *Superintendent, South Central Texas Division, Pan American Gas Co.*

flow control valves on each run is indicated by gauge. The pressure reducing regulators and flow control valves are controlled by instruments, and the flow from each run is recorded mechanically. The temperature from each run, the specific gravity, and calorific value of the Chocolate Bayou gas are recorded. Any one of the inlet field lines can be bypassed ahead of the scrubbers into the other runs. The flow controllers on the inlet field runs are to enable the Pan American Gas Company terminal operators to take a constant steady flow from any given field.

Carbide Meter Runs

The header at the end of the field inlet runs delivers 600 pound wet natural gas to Carbide through a sixteen inch meter run. The pressures are indicated and the flows, temperatures, specific gravities and BTU values recorded from each of the three Carbide meter runs. There is a maximum and minimum pressure switch on the 600 pound per square inch gauge Carbide meter run which is connected to an alarm horn. The alarm horn is to warn the terminal operators that the pressure on this delivery line is getting too high or too low. Carbide returns a portion of the gas at 250 pounds per square inch gauge and another larger portion at 100 pounds per square inch gauge to be delivered to the other Pan American Gas Company customers at Texas City.

Other Sales Meter Runs and Equipment

There are six sales meter runs in the Gas Regulating Terminal for other plants at Texas City. The pressures are indicated and flows and temperatures recorded from each of these. The Pan American Refining Corporation 100 pound per square inch gauge meter runs have a minimum alarm switch that warns the terminal operators when the pressure is getting low.

Ahead of the Carbide header on the field inlet runs is a header for the emergency regulator stations. These stations are set to come on automatically in case Carbide does not return sufficient gas to maintain the delivery pressure to Pan American Gas Company's other customers.

These pressure reducing regulators are also instrument controlled from the central control room. Each station has a scrubber and four inch relief valve down stream from the regulators. These relief valves also afford relief for the Carbide return meter runs and other sales meter runs.

All liquids from the scrubbers are dumped into a flash tank which has from five to twenty pounds per square inch gauge pressure on it. Vapors from the flash tank go to the Pan American Refining Corporation where they are compressed and used. The liquids are dumped from the flash tank into storage tanks and the water from the storage tanks bled into the Pan American Refining Corporation sewerage system. This water is from the hydrates in solution in the wet gas received by Pan American Gas Company in the field. Any one of the meter runs or lines can be bled down and vented away from the plant area. Steam for the heater bends and the office building is obtained from the Pan American Refining Corporation.

Control Room

The control room is unique, in that from there it is possible for the operator to control the flow or pressure on any of the field inlet or sales meter runs. All the instruments are operated by dry air with dry gas as a standby to come on automatically in case the air supply fails. There is a flow diagram in the control room that shows all the valves and these valves in turn are tagged with red or green discs according to whether they are open or closed at that particular time.

The atmospheric temperature and the temperature of the gas flowing in each of the four inlet meter runs and nine sales meter runs are recorded and the flow for the thirteen meter runs is automatically recorded in the control room. There are indicating pressure gauges in the control room for the inlet scrubber pressures, inlet meter run pressures, steam supply pressure, air supply pressure, flash tank pressure, and the pressures on each of the sales meter runs. The calorific value and specific gravity of the Chocolate Bayou gas, the 600 pound gas to Carbide, and the 100 pound and 250 pound return gases from Carbide are recorded in the control room. All flows and readings are recorded hourly by the terminal operator on a daily log sheet. The terminal operator can check his operations by checking the inlet flows against the sales flow.

Field Control Features

Each of the terminal inlet meter run flows is checked at frequent intervals against the field deliveries, which enables the operator to promptly note any irregularities that may develop in the gas measurements. High pressure reducing regulators are used at various wells in both the Chocolate Bayou Field and the Dickinson-Gillock Area to meet fluctuations in the load demand. If the demand at the Texas City Gas Regulating Terminal increases at the rate of 10,000 MCF daily within an hour, this is reflected in the field by a reduction in the main line pressure, and the field regulators on standby service automatically open to supply the increased load demand.

Pan American has a private telephone system that connects the offices in the fields, from which gas is received, with the Texas City Gas Regulating Terminal.

CRUSE-KEMPER COMPANY
AMBLER, PENNA.
GAS HOLDERS
Low Pressure High Pressure Inspection
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Over 40 Years of Sound
Steel Plate Construction

Meter Repair Practices

By

B. C. Holman

Superintendent of Meters
Minneapolis Gas Company

IT IS generally acknowledged and rightly so, that correct meter performance and economical meter maintenance are essential problems of every gas company management. The meter commands much attention and is often referred to as the cash register of the industry, and to many customers the meter is the only source of contact with the company. This influence is usually felt only on meter reading and billing dates and its accuracy stands as the only arbiter of the customer and company's interest.

Since the meter assumes a role of such importance, it is only reasonable to presume that it must be a distribution expense because of the periodic inspection and maintenance costs involved. However, the correct amount of such maintenance to effect a desired performance standard is another story arrived at only by a systematic application and use of performance data and records.

In addition to a proper maintenance program there are several fundamentals which are not too directly connected with meter repair shop practices but which affect accuracy and should be given earnest consideration. The preceding statement refers to the materials used in the construction of the meter and its component parts, and the workmanship and inspection involved during its manufacture and also the handling of the meter outside the repair shop. Although it is not necessary to silk glove meters, nevertheless, it is deserving of reasonable care. This fact should be demonstrated forcibly to all employees, especially the meter installers. Proper racks and compartments in the fitting or service trucks should receive much attention since improper handling and jarring may lead to erroneous test results.

The following discussion will deal primarily with the repairing of small tin-case meters through the various stages of repair and in general will cover the methods and practices in use by our company.

Repair Classifications

A definite policy should be established which will govern the repair classification of each meter. The factors employed will be incoming proof or test, length of time from last repair, nature of such repair, general appearance, construction, and age of meter. The consideration of these factors will vary with various companies and are determined by past experiences.

In general, meters will fall into the following classes:

1. **O.K repair:** A meter within established limits on test—registers satisfactory on slow motion test, and in service for such a period which does not warrant further repairs.
2. **Readjust repair:** A meter not within established legal limits—O.K. in other respects, and in service for same period as an O.K. meter.
3. **Partial repair:** A meter, regardless of test which has been in service for such a time to warrant gallery repair and possibly oiling of the diaphragms—not removing the back and fronts. Length of service does not warrant examination of the diaphragms.
4. **General repair:** Same as the partial repair class, except the length of service has been of such that an inspection of the diaphragms and component parts require examination and repair.
5. **Diaphragm repair:** A general repair class meter where diaphragms have been condemned.
6. **Minor repair:** O.K. class meter requiring minor case repairs.

The adjoining flow-sheet of small meter repairs lists the various repair operations required under each class of repair at the Minneapolis Gas Company.

Repair Systems

Shortly after the advent of natural gas to Minneapolis, we found it necessary to adopt an extensive re-diaphragm program. This required enlargement of our shop and a substantial increase in shop personnel. Shop efficiency was somewhat increased by setting up a line system of repair, re-diaphragming approximately 2500 meters each month in addition to other repairs. However, this system is generally limited to only large shops, whereas small shops find it more practical and economical to use the individual repair system. At the present time we find it more practical to use a semi-line system, breaking our repair procedures into three steps, namely, stripping, tinning, diaphragming and closing in, and fitting up, whereby a repairman does only one step in the procedure.

In-Test

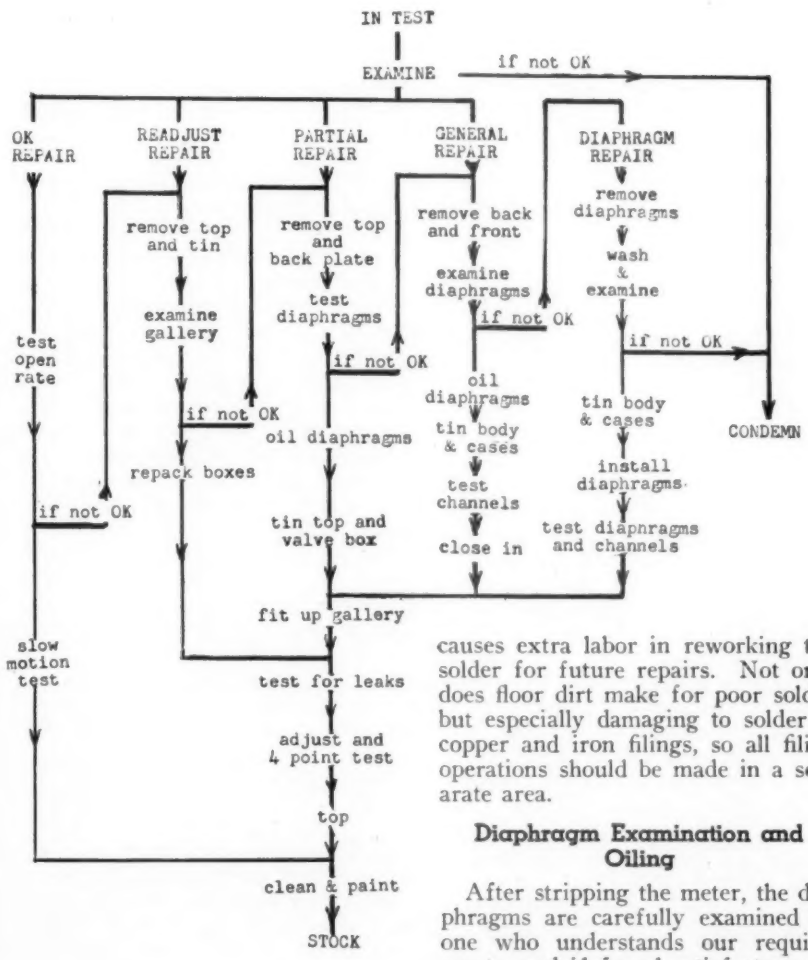
This test is of utmost importance since future repair policies are based on its accuracy, and any change made in the nature of repair or use of improved material will show the effect at this point. To insure accurate in-test results, the following items must be considered concerning the provers and test.

1. **Correct alignment of the prover tank and bell.**
2. **Locate provers out of drafts and in an area where temperature changes are not sudden or excessive.**
3. **The meters to be tested should remain in the vicinity of the provers for at least ten hours to acquire prover temperature.**
4. **The air used in testing should be saturated with water vapor to assure no change in volume due to vapor tension.**
5. **It is recommended that 4 to 10 inches of light transformer oil be used as the sealing liquid in the prover tank.**
6. **Clean provers is also of great importance. As copper tarnishes rapidly its surface becomes a collector of foreign material, thereby preventing the sealing liquid from draining off properly. This condition can be somewhat remedied by chrome plating of the prover bell. When the liquid becomes dirty it should be filtered or replaced with new material.**
7. **Provers should be checked against a standard cubic foot bottle periodically.**
8. **Locate the prover scale pointer and meter dial as close to eye level as possible to avoid parallax.**
9. **Follow a definite repair classification for subsequent repair as partially found by the in-test.**
10. **Purge meters by passing approximately one cubic foot of air through the meter, and start and finish the test at a point on the up swing of the index test hand.**
11. **Use Standard check and open rate caps so data obtained will be uniform. This is of value for comparison purposes with other companies.**

Stripping

Starting in with the removal of the top, we use two 4 pound coppers suitably shaped. Care is exercised not to abuse the top or unsolder the seal between the flange and the base of the tube screw. The meter is

FLOW SHEET OF GAS METER REPAIRS



tilted till the excess solder runs off and the flange is immediately tinned, with special care to remove any solder needles.

A hatchet copper is found to be adaptable in removing the valve box cover because of the additional amount of heat stored near the blade in case trouble in removal is met. Care is used not to place strain on the triangle plate which may cause unnecessary binds when fitting up.

In removing the backs and fronts six pound coppers are used, unsoldering the sides, bottom and lastly the top seam. We have found we do less damage to the backs and fronts if the bottom seam is stripped before the top seam. Care is also exercised to remove any solder needles which may cause an accident in future handling. Here, let us caution, the careful recovery of solder pays and is best accomplished by using proper stripping grilles or pans under the meter rather than allow the solder to run on the work bench or floor to be mixed with floor dirt. Any foreign material picked up only causes extra labor in reworking the solder for future repairs. Not only does floor dirt make for poor solder but especially damaging to solder is copper and iron filings, so all filing operations should be made in a separate area.

Diaphragm Examination and Oiling

After stripping the meter, the diaphragms are carefully examined by one who understands our requirements, and if found satisfactory the valves are removed, the diaphragms are tested at 3" W. C. pressure and oiled with a definite amount of a suitable dressing through the diaphragm port. The testing apparatus used is a combination pressure-time tester so co-ordinated with our four-point tester so as not to contradict that test. We are now building an oiling machine capable of holding 24 small meters which turns the meters twice a minute. The meters and the oil will be preheated to 130 degrees F. We have found oiling from the flesh side of a diaphragm to be more effective than oiling from the hide side especially when the meters are turned and handled properly.

An extra precaution well worth the additional cost if a mould condition is prevalent is to add an inhibitor to the dressing if the dressing is prepared in your shop, or specify the supplier to include it in their dressing formula. The following formula is recommended as quite satisfactory:

1 part Cresol by weight
1 part Beta Naphthol by weight
5000 part dressing by weight

Washing

The ideal practice, had we seen the convenience of it, would have been to use a paint readily removed by commercial strippers applied as a spray over the meter. This would have allowed for more rapid and cleaner stripping in subsequent handling of the meter. However, with us and possibly with some of you, many different types of paints were used and in the course from a new meter to the next diaphragm repair many layers of various paints were applied. We have not found a stripper that will readily remove the various paints we have used, so as to facilitate its removal we attached an 80# air line to the rinsing tank and line. This increased water pressure and air does a good job in removing the loosened paint flakes. We attempt to separate factory painted meters from the meters painted in our shop prior to 1942 at which time we began giving the type of paint used some serious consideration. This has speeded up the washing operation considerably. The temperature of the solution in the boil-out tanks is maintained at approximately 200 degrees F. The concentration of the solution is 6 oz. of stripper to 1 gal. The rinse water should not be cold as we have found that too great a difference in temperature between the boil and rinse water causes many tube leaks particularly on the long tube type meters.

Tinning

Special irons with a large flat surface have been found to possess enough merit to continue their use. In tinning the cases, the meter is tilted to allow excess solder to run off. This allows a smooth thin coating to remain. If wiping is necessary, use a stub one inch hair brush and follow up while the solder is still molten. Rosin-oil fluxes are recommended for this tinning operation unless the surfaces are rusted. The small meter parts including the backs and fronts are tinned by dipping the edges in a molten solder bath and shaking or brushing off the excess solder.

Diaphragming

In this operation skill developed from experience is of great importance. Special chisel coppers have been found to be best adapted for this work. Several precautions to be considered are:

1. Select diaphragms of approximate equal weight and firmness.

2. Center the diaphragms to the partition so the material does not touch the cases.

3. A properly cut notch to fit the channel will also save time.

4. Use a smooth even and rapid stroke in the soldering operation.

5. Where the operator is not too skilled, it might be well to use a damp wicking placed next to the ring when soldering around the channel.

On large meters diaphragming we attach a brass wire to each side of the disc, looped to extend about an inch above the outer diaphragm ring. We have found that meters idle for a period, the diaphragm tends to collapse and hang over the sharp edge of the outer ring and in many cases become cut. The ring prevents the diaphragm from folding over and acts as a rest. Excessive pressures, any over 4″ W. C. should be avoided in testing the diaphragm. If water and air is used to determine the leak do not apply pressure by pushing down on the disc or pulling on the flagarm, but place a weight on the disc which will give the pressure desired. Before attaching the carriage to the disc, line up the rings of the diaphragms. This ordinarily will allow for a more natural diaphragm travel and will prevent locking of the rings.

Closing-In

In removing the backs and fronts some distortion is bound to occur which requires straightening. We have found the adjustable bar folder notched to fit various size backs and fronts and set at an agle slightly less than 90 degrees to be most satisfactory This allows the backs and fronts to fit snug when snapped into place. The bottom seam is then freely soldered, the side seams are soldered and plumbed and finally the top seam is made. Check all corners with a small bead of solder.

Fitting-Up

The procedure of fitting-up is of the utmost importance and should be left to the most skilled mechanic. An analogy has been made that the moving parts of a meter above the table may be called the muscles of the meter and any failure of these parts will result in inaccuracies. Therefore, to insure the utmost in long life and accuracy the fitting-up should be thorough to remove binds, lost motion, and the final assembly of the parts with correct relation to each other. In our shop we proceed as follows:

1. Grind valve and valve seats.
2. Remove play in valve arms, flagarms, and crank frame using new parts when required.
3. Wash table to remove oil, dirt, and grit.
4. Set valve arms with relation to their seats.
5. Set tangent with relation to the valves.
6. Replace backplate or valve box cover.
7. Equalize division of flagarms.
8. Install solder seal index box, index and axle.
9. Pack boxes and test for leaks.

1. Grind valves. #80-#125 impregnated Si C cloth—cemented to a glass block makes a successful tool. Care should be exercised not to press down too hard to distort the block, but use a light rotary motion. The evidence of criss-cross lines uniform on the bars will insure sufficient grinding. Mechanics with large hands may find a "pusher" to be of some advantage. Excessive grinding of the valve covers should be avoided as generally only a good cleaning is required.

2. Removing play in valve and flagarms and crank frame. Excessive play should always be removed since this will affect valve timing. It is advisable to replace worn parts with new style bronze bushed parts, rather than continue with the old practice of cutting and refitting.

3. Wash table using a small amount of Stoddard solvent and a brush to remove all dirt. Lay meter on side until excess solvent has drained and evaporated.

4, 5, 7. These procedures although very important are somewhat difficult to explain without having an actual valve assembly for demonstration. Therefore, anyone interested should carefully follow the procedure used in a later demonstration. Here let it suffice to say that for correct operation there must be the proper relation of the valves to the seats and the diaphragm as well as proper division of the flagarms.

6. Replace back plate or valve box cover. Two precautions in this operation are namely; rest meter in such position so that no solder runs into the valve box—and do not press too tightly to the triangle plate when soldering. This may cause a bind in the crank which is difficult to correct. Two piece backplates have the advantage in that they are much easier to remove, install and give a meter better appearance.

8. Wash out the index with solvent, oil bearings lightly and be sure the index gears are free before placing in the meter. Care should be exercised to replace the index plumb to eliminate binds at the axle wheel and worm.

9. Packing boxes. We believe a definite reason why meters lose their accuracy is because of improper methods and material used in packing the stuffing boxes. If a box can be packed lightly and uniformly enough without causing unreasonable friction, the proof will not change materially. A tightly packed box will cause undue friction and if adjusted as such and placed in service will be found to vary up to as much as 10% fast. It will also be found not to be as gas tight as a loosely packed box. It is therefore recommended to use a special cut wool felt lubricated impregnated washers in conjunction with solder-seal index boxes. This will insure positive sealing of the upper compartment and permit looser packing of the stuffing boxes. We are now packing our meters much lighter than formerly and require the boxes to hold a pressure of 12″ to 15″ W. C. Our hydropneumatic tester air lines are equipped with three-way valves allowing us to use this pressure in testing not-topped meters and a three pound pressure in testing the case and tubes.

An operation we perform, somewhat out of the ordinary meter shop practice is spacing the center to center distance of the tube screws. By having all 5 lt. meters uniform in this respect we have found meter installation work, much simpler, quicker and safer, especially where rigid meter bars are installed. We have also found tube leaks have been materially reduced. This operation is performed prior to the installation of the valve box cover and rechecked again at the topping bench.

A procedure becoming more common in practice is to place a metal strip on the case. This strip is coded in such a way as to indicate the date and the nature of each repair. It eliminates the necessity of referring to history cards in classifying meters for future repairs.

Adjusting

The adjusting procedure will vary with various companies and the as-left calibration must necessarily be determined from past experience and the trend of curves obtained from incoming proof data. However, it should suffice to say that both speeds should be brought together and within proper limits setting the open rate slightly faster than the check on meters with leather diaphragms, and the opposite on meters with composition diaphragms. Check all adjustments by a full revolution of the proving circle.

Most shops have introduced with excellent results the installation of in-

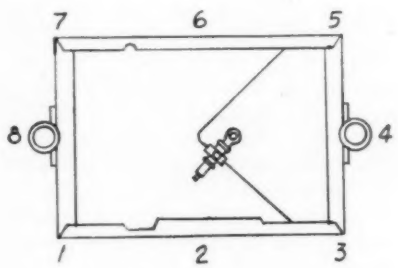
clined gauges for detecting binds and unbalances within the meter. Other devices such as jigs and scales for setting tangents, and fine readers have proved themselves of value by enabling speed with accuracy in adjusting.

The same precautions mentioned under incoming tests pertaining to temperature, air conditioning, etc., applies equally as well to the adjusting operation.

Four Point Test for Internal Leaks

This method of locating internal leaks is used only on open top meters with enclosed valves, and is much more rapid and accurate than a slow motion test. The flagarms are lifted from the tangent wrist and tangent is pointed to the various positions as numbered on the diagram herewith.

Gas may be used in this test, and either an inclined gauge or a Rotameter can be used in conjunction with air, thereby eliminating any danger of explosion. An inlet pressure not to exceed 1½" W. C. is sufficient to locate any leak without distortion to the diaphragms. In our shop we use a calibrated Rotameter rejecting any meter with leaks exceeding ¼ CFH. As previously mentioned this and the diaphragm testing apparatus are coordinated so as not to contradict each other. The location of the leak found at the points so numbered can be determined by using the following chart:



It should be noticed that either points 1, and 5 are common to all leaks, so time may be saved if the initial test is made using points 1, and 5 only. If neither point indicates a leak the meter may be assumed to be O.K. However, if either one does indicate a leak, all points should be checked to determine its location.

After four pointing, the flagarms are then placed in position, pins inserted, and all working parts lightly greased.

Topping and Case Testing

The tops having been previously tinned are straightened as well as the meter flanges. The top is then soldered in place using care that no solder runs down into the index. In soldering the top, special care should be given the corners and the base of each tube screw. There are several recommended methods for testing after topping, from time pressure tests to high pressure tests only. We have found it expedient to dip test the meter under 115° F. water using 3# inlet pressure for approximately two minutes.

Nature of leak	Meter Rotation	
	Clockwise (leaks on points)	Counterclockwise (leaks on points)
Front Diaphragm	1, 2, 3, 5, 6, 7	1, 2, 3, 5, 6, 7
Back Diaphragm	1, 3, 4, 5, 7, 8	1, 3, 4, 5, 7, 8
Front fork channel	1, 2, 3	5, 6, 7
Back fork channel	3, 4, 5	1, 7, 8
Front inlet channel	5, 6, 7	1, 2, 3
Back inlet channel	1, 7, 8	3, 4, 5
Partition	1, 5	1, 5
Valves or stable	all	all

Cleaning and Painting

This operation is the dress up operation as well as a metal preservative operation. Excess solder, loose rust, oil and fluxes should be thoroughly removed, and the identification badge should be cleaned. The meter is then painted with a coat of good quality paint by whatever method is preferred, brush, dipping, or spraying.

The badge, index glass, and tube screws should be masked for appearance and ease in finishing the painting and stocking operation. Meters placed in stock for long periods should be re-tested before placing them in service.

This concludes a brief outline of repair shop practices, particularly as we apply them. The purpose of this meeting is to exchange ideas so we may all participate in the discussion which will follow the repair demonstration.

Presented at Gas School and Conference, Midwest Gas Assn., Iowa State College, Sept 13-15, 1948.

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An Independent Organization Not Affiliated With Any Other Builders of Gas Holders

Wisconsin Utilities Association Holds Three-Day Convention at Milwaukee

ONE of the most successful conventions of Wisconsin Utilities Association ever held took place at the Pfister Hotel, Milwaukee, November 1-3 with a registration of 464. Included were Gas Technical and Gas Commercial Sessions as well as Joint Commercial, Technical Gas and Electric Sessions followed by Joint Luncheon Meetings.

At the Joint Luncheon on Monday, C. T. Dickeman, Vice President of Michigan-Wisconsin Pipe Line Co. gave a comprehensive description of this line now under construction. This will appear in the January issue.

At the Tuesday Gas Technical Session, W. E. Keeman, Distribution Engineer, Milwaukee Gas Light Co. spoke on System Development for Increased Loads. He pointed out that Distribution Engineers of gas companies will need to be philosophers and economists to figure changes that will need to be made in transmission and distribution systems of gas companies to meet increased use of gas by all customers when the changeover to natural gas takes place.

Certainly, available gas supply, rate structure, regulative restrictive orders, and the social economy of the people we serve, together with commodity prices of competing fuels, will all be factors in influencing the ultimate construction of gas mains.

Basically the design of a distribution system is for the purpose of producing and maintaining a system of the proper pipe size and other related facilities to render the proper service to the customer at reasonable cost. The factors which influence the demand placed on a system are never clearly known and are constantly changing. It seems paradoxical to undertake the design of something without knowing exactly what to design for. So the gas engineer has to be somewhat of a philosopher as well. Distribution design is a balance between risking odds by chancing to get by with too little, as against paying too much for the insurance of an oversize system. Nevertheless, good distribution design, with a resulting economically operated system, is not attained by chance. It involves the close study of the pipe capacities in the system and the setting up of a design load demand to govern the design.

Parallel, joint and individual sessions comprised the program of the Technical and Commercial Divisions of the Gas and Electric Sections of the Wisconsin Utilities Association, held at Milwaukee, November 1st to 3rd. We give our readers herewith, abstracts of some of the papers and addresses of particular interest to gas men. —Ed.

To the present hourly demands for a district as a whole, and by blocks, there must then be added an assumed new load to be realized after conversion to natural gas. Our company has assumed this additional load to result from space heating and from any industrial customers in the district. We assign a space heating saturation of from 15% to 65% in the various districts comprising our distribution system. On the upper East Side we have a 65% saturation, and in some of the older residential areas, where homes are 40 to 60 years old but still not decrepit, we may assign 15% saturation.

The number of the present space heating consumers in a district is a good gauge to help determine the estimated future per cent saturation. Likewise the location and number of present space heating consumers in each block can be used as a percentwise basis to distribute the additional new assumed space heating load.

Robert Kyle, Gas Machinery Co. Cleveland in commenting on available oils said that research, sponsored by the American Gas Association has determined that low grade oils as well as gasoline and kerosene can be converted into gas. As soon as the methods of conversion have been refined, it is hoped that the gas industry will carry on further operations with heavy, cheaper oils.

In spite of the tight and spotty situation in present day oil distribution, more and more oil is becoming available daily. Dr. Gustave Egloff of the Universal Oil Products Company has just made the interesting announcement that oil reserves versus demands are good for 100 years. This is exclusive of shale oils, which are present in abundance, waiting for development of means of recovery. Oil demands are rising, but so is production.

At the Joint Luncheon on Tuesday, W. E. Schubert, President Wisconsin Utilities Assn. said in part:

"The gas utility picture in Wisconsin for the winter ahead is very much brighter than that of a year ago. Liquid petroleum gas capacity additions have been made in numerous cases and conversions have been effected. Unless the supply of liquid gas is interrupted by source and transportation shortages, these additions will make themselves felt in an emphatic way. The gas industry is also shaping its local programs to that period early in 1950 when natural gas will become available through the facilities of the Michigan-Wisconsin Pipe Line Co. Mr. Dickeman has reported to our association from time to time on the progress being made by the line construction crews, and his reports have given many of our gas men a smile of satisfaction — something which has been very rare indeed among Wisconsin artificial gas men for many years.

"Recent estimates place the natural gas line cost at approximately $110,000,000 to serve the states of Michigan and Wisconsin. There is little doubt that a substantial amount additional to the figure quoted will have to be spent by local companies in making changeovers, adding mains of higher capacity in some areas because of interconnections and in effecting customer conversions."

Removal of stoppages in mains was discussed by John Hahn, Supervisor Milwaukee Gas Light Co. He stated that during the 1948 season a total of 20.3 miles of 4 and 6 inch gas main were cleaned by the Milwaukee Gas Light Co. so that better service would result. This work consumed 146 days and approximately 95% of all such cleaning to date has been on mains laid

prior to 1900. Mr. Hahn reported in his description of the methods used in Milwaukee for the location and removal of main stoppages.

In cases where a customer's gas is to be turned off for an eight hour period, the company now notifies the occupant by card 24 hours in advance, giving reasons for the work in writing. A temporary arrangement is provided, however, where service is vitally needed by hospitals, businesses or other greatly essential outlets.

L. M. Stoll, Wisconsin Public Service Corp., Sheboygan spoke on leakage problems and prevention as follows:

"The Wisconsin Public Service Corporation was confronted with an unusual leakage problem in 42 miles of its gas transmission lines when it converted from manufactured to propane gas. Leakage maximum during the seven months before the changeover was recorded at 13 per cent, but immediately after conversion it rose to 38.6 per cent, the following month to 43.8 per cent, and finally to a record peak of 56.8 per cent. The utility was unaccountably losing more gas than it was selling.

"A definite solution was not found until snow had fallen, when it was possible to locate the leaks because the tendency of propane gas to confine itself between the ground and the layer of snow covering it. Upon investigation it was determined that most of the leaks were on expansion couplings, and that these had failed because dry propane gas had absorbed the moisture and light oils—or the manufactured gas 'drip'—from the coupling gaskets causing them to shrink and break the seal.

"Because a shutdown of the gas supply to repair more than 200 leaks was not feasible, the work was done under pressure by utilizing special new equipment and ingeniously inserting new gaskets."

G. A. Anderson, gas engineer, Burlington, Wis., reported the effect of natural and liquefied petroleum gases on meters and regulators used by the Wisconsin Southern Gas Co., Burlington. This company changed over from manufactured to natural gas two years ago and the conclusions he reached were of especial value and interest to other gas companies in the state who are making preparations for the entry of this new fuel into their systems. His study showed that the devices now used for measuring gas do not appear to have been seriously affected by the conversion. However, the experience to date has been such that no definite conclusions are possible.

CHAIRMEN ELECTED

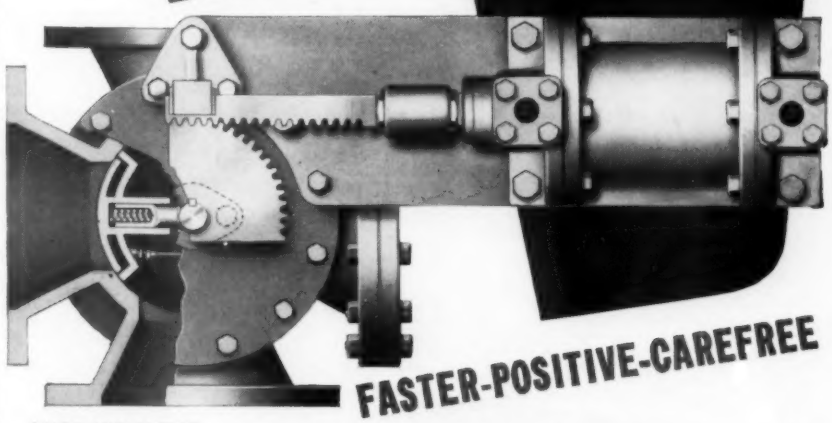
Theron Brown J. H. Dunham

"As a dry natural or LP gas replaces manufactured gas in a distribution system," Anderson continued, "diaphragm meters generally tend to run excessively fast and two methods and combinations of the two are used to forestall excessive increases in fast meters as well as to improve performance after the changeover. New meters and adequately repaired old meters will stay in better operating condition on natural and LP gases than on manu-

(Concluded on page 52)

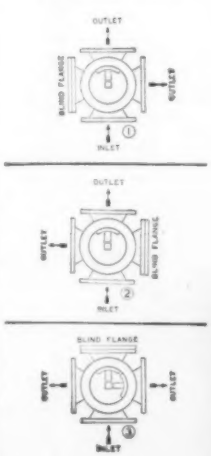
NATIONAL REVERSE VALVES

SPEED-UP THE OPERATING CYCLE For REFORMING NATURAL GAS



FASTER-POSITIVE-CAREFREE

INLET AND OUTLET ARRANGEMENTS OF REVERSE VALVE



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This National Valve is designed for use in Gas, Steam or Air Service with pipe lines of 6", 8", 10", and 12" diameter.

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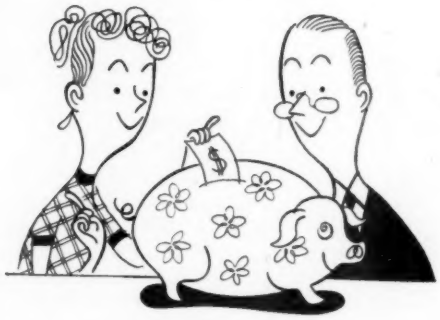
Servel readers have "refrigerator on the mind"

Many have been looking around for a new refrigerator



Many intend to buy a new refrigerator within the next six months

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During 1949, Gas Refrigerator advertising will again help pave the way for your sales by gaining high attention and readership. And Servel ads are doing *more* than building readership. They're building your prospect list! The advertising was tested to find out *what kind* of readers it was reaching—immediate prospects or casual "readers-by." The results showed that Servel is doing the best job of attracting the refrigerator-minded families. A large percentage of Servel readers are definitely in the market for a new refrigerator. A great many expect to buy . . . very soon.

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There are hundreds of prospects in your area . . . and Servel advertising is talking straight to them. They're listening . . . they're impressed. That's your cue to launch your own Gas Refrigerator promotion . . . to tie in with the national campaign. For when you promote Servel locally . . . you're directing prospects to *your showroom*. And that's the only place where you can change refrigerator prospects into Servel buyers. See your "Tell and Sell" portfolio for full information . . . or write to Servel, Inc., Evansville 20, Ind.

Servel
The GAS Refrigerator

Recent Court Decisions
Affecting Gas Utilities

Condemnation vs Easement

By
Leo T. Parker
Attorney at Law
Cincinnati, Ohio

A GAS COMPANY may acquire a legal right to use private property by (1) purchase of the real estate or property; (2) condemnation or eminent domain legal procedure; (3) purchase of an easement; (4) prescription.

The right of "prescription" means that one has had continuous use of land or gas therefrom for so long a period that the right becomes absolute. A gas easement is the right of a person, corporation, or municipality to, in some manner, use another's real estate. Easements may be implied.

Easements are classified as continuous or non-continuous. A non-continuous easement is one where an act or contract of the land owner is essential, for the easement, such as allowing or granting a right of way. A continuous easement is one which operates "without the interference of man."

Law of Condemnation

It is well known, of course, that private property may be condemned or appropriated for public benefit. Obviously, the "reasonable" value of the appropriated property must be paid to the owner of the condemned property.

Many higher courts have held that: "Fair market value" means neither panic value, auction value, speculative value, nor a value fixed by depressed or inflated prices. Moreover, a fair market value is *not* established by sales where a price offered is so small that *only* a seller *forced to sell* will accept this price.

When there is no real market, for property on a particular date, an indication of the intrinsic economic and commercial value of the property to the owner and of his financial loss from the appropriation may be shown by evidence and testimony.

Damages Allowable

According to a recent higher court the measure of damages for value of land taken in condemnation proceeding is ascertained by comparing the fair market value of the whole land *before* the taking with its fair market value after the taking, *excluding* from consideration enhancement in value resulting from the utilization of the land taken for the purpose for which it was taken.

For example, in Johnson v. Consolidated Gas, Elec. Light & Power Company, 59 Atl. (2d) 918, only a part of a farm was appropriated for the Consolidated Gas, Electric Light and Power Company. The lower court awarded the farm owner $16,-103. The farm owner appealed to the higher court contending he should be awarded more or greater damages. The higher court refused to increase the damage allowance, saying:

"Ordinarily that measure of damages is ascertained by comparing the fair market value of the whole lot before the taking, excluding from consideration any enhancement in value resulting from the utilization of the land taken for the purpose for which it was taken."

For comparison, see Pumphrey v. State Commission, 2 A. (2d) 668. Here a city sought to condemn 1.9 acres of land. In speaking of the financial loss to the owner of the land, this court said:

"The measure of that loss is the value of the land taken, and since the land taken is part of a larger tract, the diminution in value of the larger tract, if any there be, caused by the taking of the particular segment thereof."

And again see Campbell v. United States of America, 266 U. S. 368. This court said:

"Market value is defined as the price which an owner willing but not obliged to sell would accept for the property and which a buyer willing but not obliged to buy would pay therefor."

Just Compensation

A determination of what is the fair, economic, just, and equitable compensation, under normal conditions, to the owner of appropriated property calls for consideration of all elements of value that inhere in the property.

For example, in the case of New York, 14 N. E. (2d) 789, it was disclosed that the Constitution of New York prohibits the taking of private property for public use without "just compensation."

Certain privately owned property was appropriated in 1936 in condemnation proceedings. Evidence was introduced proving that the property had no market value in 1936. However, a fair market value of the real property in 1930 was presented to the court.

The legal question arose whether it was proper and fair to the property owner for the court to base the "just compensation" or value of the property on its 1936 market value. The court held that this method of arriving at the amount due the property owner is unfair. This court held that the admission of testimony as to the fair market value of the land in 1930 was proper, since the evidence indicated that the property had no market value at any time since 1930. The court said:

"In a general way, the market value of real property is the amount which one desiring but not compelled to purchase will pay under ordinary conditions to a seller who desires but is not compelled to sell."

On the other hand, the courts have held that the owner of private property, who sues to recover damages for unauthorized use or condemnation of his property, cannot base the suit on speculative damages. The property owner must prove that the amount of damages sought is reasonably justifiable and that he actually sustained this loss as a result of unauthorized use or appropriation of his property.

For example, in McCrea v. Georgia, 167 S. E. 540, it was disclosed that the owner of property sought to recover more than the actual damage of his property. This court said:

"Remote and speculative or possible damages are not allowed."

Jury May Decide

The courts consistently hold that a jury may listen to testimony of witnesses, with respect to the valuation of condemned or appropriated property, but it is not obligated to make the award strictly in accordance with the valuation as estimated by witnesses.

For example, in Commission v. Lincoln, 164 Atl. 476, it was disclosed that certain expert witnesses testified with respect to the valuation, and the amount of damages which should be allowed to the owner of private property appropriated for public purposes. The jury rendered its verdict for an amount considerably less than the valuation estimated by the witnesses. The owner of the property appealed to the higher court contending that the jury's verdict was erroneous. However, the higher court refused to interfere with the jury's verdict, and said:

"A jury, under such circumstances, need not find in the precise figures of an expert's estimate. . . . When a witness testifies that in his opinion an owner is damaged in a certain sum, he necessarily is understood to testify that the owner is damaged in every lesser amount. It is for the jury, within reason, to decide whether all or some part of the figure that springs out of the witness' opinion is the actual damage."

Nominal Damage for Right of Way

Usually, the amount of damages which shall be awarded the owner of property for use of a strip of his land, for installation of a gas main, depends entirely upon the depreciation of the property as a result of the installation.

For illustration, in Missouri v. Neely, 246 N. W. 483, it was shown that a pipe line was laid diagonally across a 30-acre tract of land for a distance of 78 rods. The landowner contended that he should be entitled to $1,500 damages, but during the trial evidence was introduced showing that the actual value of the land before installation of the pipes was around $250 an acre. Therefore, the higher court held the land owner entitled to recover only $390 damages, and said:

"The witnesses on both sides were practically unanimous in the opinion that the value of the landowner's 30-acre tract, before it was intersected by the pipe line, was $250 an acre. . . . Both sides resorted to affirmative testimony of the nature indicated, and, though conflicting on the issue of damages, there is sufficient evidence to sustain the judgment of the district court."

Suit Dismissed

Under no circumstances may a municipality appropriate a gas company's property whose location is not properly described in the condemnation suit.

In Town of South Tucson v. Tucson Gas, Electric Light and Power Company, 149 Fed. (2d) 847, it was shown that a city filed suit to condemn and appropriate the entire system *as a whole*, of the Tucson Gas, Electric Light and Power Company and not a mere disjointed part or parts of the system. The testimony showed that a major portion of the company's properties was situated in another municipality.

The higher court dismissed the suit, saying:

"To have acquired such a disjointed remnant of the existing unit of the Power Company, the resolution of the Town Council should have read 'for the purpose of acquiring that part of the whole system which can be legally condemned'."

This same relative law, of course, is applicable where a gas company

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seeks to appropriate or condemn private property.

For comparison, see City of Tucson v. The Gas, Electric Light and Power Company, 152 Fed. (2d) 552. This court held that under common state laws a city is not precluded from condemning property of a gas company by reason that a portion of the utility's plant are outside the city.

Law of Easements

A valid easement may be secured by contract, agreement or a clause in a deed. Since the description and contract clauses in deeds often are written by Surveyors not concerned with fastidious legal refinement, it is common for disputes to arise regarding legal boundaries, easements, and the like. It is certain that the holder of an incorrect deed *cannot* have it corrected or reformed unless he proves *conclusively* that the alleged mistake was mutual and unintentional.

For example, in Holda v. Consumers Power Company, 20 N. W. (2d) 248, the higher court said:

"To reform a written instrument on account of mutual mistake, the evidence of the mistake and the mutuality thereof ought to be clear and satisfactory, so as to establish the fact beyond cavil."

Also, see Lyons v. Cahfey, 219 Mich. 493, 498, where the court said:

"It is fundamental that, when it is sought to reform a written instrument on account of a mutual mistake, the evidence of the mistake and the mutuality thereof must be so clear as to establish the fact beyond cavil."

Therefore, it is quite apparent that the burden of proof is strongly upon the party asking reformation of a deed on the ground of mistake. The proof of mistake must be clear and convincing, otherwise the court will not authorize correction or reformation of the deed.

Hence, it is necessary that gas companies shall have easements clearly specified either in deeds or written contracts. Otherwise legal controversy is likely to result, without profitable or favorable termination.

Any easement is valid and enforceable such as a right-of-way for poles, lines, mains, etc. Quite obviously when considering the validity of contracts, easements, deeds, and other conveyances it must be kept in mind that competent individuals, firms and corporations may make "unreasonable" contracts and the courts will not reverse or modify such contracts. A non-exclusive easement is valid if the land is capable of being utilized by two or more persons or corporations. Therefore, unless a gas company has an exclusive easement, others may acquire valid easements. See Pasadena v. California Company, 110 Pac. (2nd) 983.

Of course, a gas company may acquire an exclusive easement, if the contract or deed so provides, otherwise the easement always and positively is non-exclusive.

Law of Abandonment

Many are the circumstances under which gas rights and easements may be forfeited or abandoned. Although the terms "abandonment" and "forfeiture" are oftentimes used interchangeably, upon the subject of the loss of gas rights, there is a decided distinction in their legal significance.

Legally, "abandonment" is the relinguishment of a right by a property owner or gas company with the *intention* to forsake and desert it.

On the other hand, legal forfeiture of a gas company's easement is the *involuntary or forced* loss of the right, caused by the failure of the gas company to abide by the terms of the contract, or deed, or by violation of a state law. In other words, "forfeiture" is a "punishment" annexed by law to some illegal act or negligence in the owner of lands, tenements, or hereditements whereby the company loses all its interests therein.

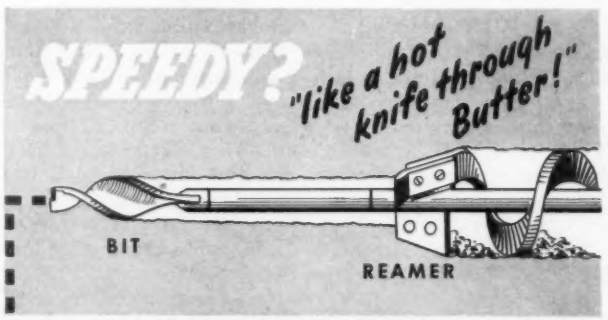
The element of *intent*, therefore, so necessary in the case of an abandonment, is *not* a necessary element in the case of forfeiture.

Practically the same law is applicable to deeds and lease contracts. In other words, all clauses and other things omitted from such instruments are forever forfeited by the party in interest.

For illustration, in Psencik v. Wessels, 205 S. W. (2d) 658, a property owner conveyed by deed certain lands. In the deed was a clause reserving all "minerals." The court was asked to decide whether this clause gave the property owner the right to remove sand and gravel from the land. The higher court held in negative, saying:

"The term 'minerals' does not include ordinary commercial gravel."

Hence, courts *strictly* construe words and clauses in contract and deeds.



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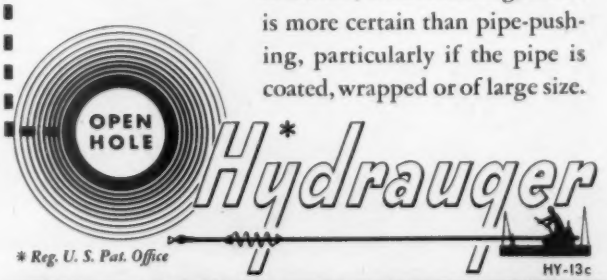

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EARTH BORING TOOL

A.G.A. At the Metal Show

THE country's largest industrial exposition—The Metal Show was the scene of A.G.A.'s largest Combined Industrial Gas Exhibit. Some 50,000 persons visited Convention Hall and the Commercial Museum in Philadelphia, during the week of October 25-29, 1948, a majority of who passed through the gas area.

It was the unanimous opinion of the 12 exhibitors in the A.G.A. section that this was the most successful Metal Show they had ever participated in.

Half of the exhibitors had "live" displays. The Selas Corporation of America, Philadelphia, demonstrated their Gradiation unit for high speed heating. This was a scale model of similar equipment in use in several plants. They also demonstrated many different types of radiant burners together with their pre-mixing machine.

Charles A. Hones, Inc., Baldwin, New York, had a semi-muffle furnace for temperatures to 2,000° F. with a full muffle furnace for temperatures to 2,400° F. both operating on atmospheric burners under automatic temperature control.

Carbomatic Corporation, Astoria, New York, had a continuous furnace demonstrating infra-red heating under full automatic temperature control.

The display of Gas Appliance Service, Inc., Chicago, Illinois, demonstrated automatic brazing and attracted a continuous group of onlookers. They also had a midget air heater delivering up to 125,000 cubic feet of air per minute. In another part of their booth they demonstrated a small forge furnace and special burners for high speed localized heating.

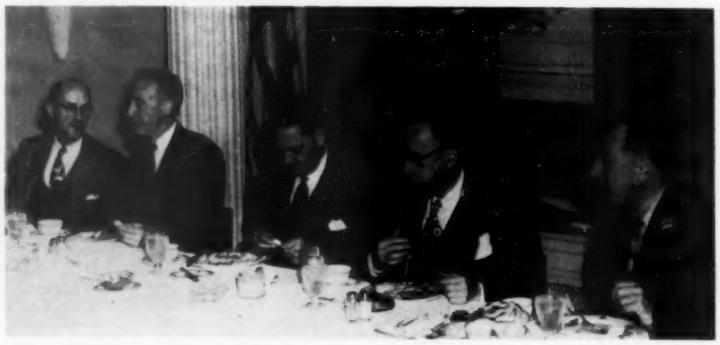
American Gas Furnace Company, Elizabeth, New Jersey, showed a large variety of industrial burners producing highly specialized flame patterns. Another part of their booth was occupied by a large continuous atmosphere furnace.

The C. M. Kemp Manufacturing Company, Baltimore, Md., showed their gas carburizer which supplied pre-mixed gas to a variety of industrial burners.

The other exhibitors in the combined exhibit who showed essential parts of their gas equipment or had a promotional display or both were: Despatch Oven Company, Minneapolis, Minnesota; Eclipse Fuel Engineering Corporation, Rockford, Illinois; Gehnrich & Gehnrich, Inc., Woodside, L. I.; The Lithium Company, Newark, New Jersey; Surface Combustion Corporation, Toledo, Ohio.

One section of the 8,000 square foot area was taken up by the A.G.A. Lounge around which was displayed a series of exhibition prints of industrial gas applications and provided a meeting place for more gas men than have ever attended a Metal Show before.

The traditional Industrial Gas Breakfast was held on Wednesday morning, October 27th, in the junior ballroom of the Ritz-Carlton Hotel, Philadelphia, during the Metal Show week. This was the 11th year of this popular affair, and found an ever increasing number of guests. Gas men from 22 cities in 10 states and the District of Columbia, Gas Equipment Men and Editors of metal publications made up the large group which sat down to Breakfast.



Head table at the Industrial Gas Breakfast, Ritz-Carlton Hotel, Philadelphia, October 27th.

Left to right: Mr. A. Combs, A.G.A. New York; Oliver Johnson, Director of Research, The Iron Age, New York; Carl Wierum, Chairman Metals Committee, The Brooklyn Union Gas Co.; M. A. Grossman, Director of Research, Carnegie-Illinois Steel Co., Pittsburgh; Alvin M. Stock, Chairman, G.A.M.A. Industrial Equipment Division, New York.

Carl Wierum, Chairman of the Metals Committee, The Brooklyn Union Gas Company, presided and introduced Mr. M. A. Grossman, Director of Research of the Carnegie-Illinois Steel Corporation, who as past-president of the American Society for Metals greeted the Breakfast Guests on behalf of that organization.

The speaker of the day was Oliver Johnson, Director of Research, *The Iron Age*. He spoke on the subject of the service his publication was rendering to suppliers of equipment in the metals field, and cited some examples of surveys they had made throughout this industry, and discussed those which were of particular interest to manufacturers and gas men.

One example cited by Mr. Johnson was regarding gas curtailment during unusual winter conditions in securing data on how many plants had stand-by equipment, how many planned to purchase such equipment and how much they expected to spend on it.

From the A.G.A. Lounge a vista of large areas greets the eye. During visiting hours, thousands surged by the interesting exhibits.

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REYNOLDS Builds a Regulator for every type of Gas Control Installation. Proved by records of performance in actual operation, or by records of factory tests on new developments, every REYNOLDS unit—whether for high pressure or low—is a proved product.

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- Atmospheric Regulators
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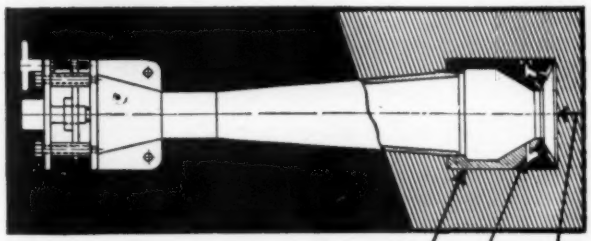
GAS CONTROL SINCE 1892

NATIONAL AIROIL FUEL OIL-GAS BURNERS

"AIROCOOL" GAS BURNER NOZZLES

PATENTED

OUT-LAST THE ORDINARY NOZZLE 2 TO 5 TIMES



"AIROCOOL" NOZZLE
¼" I.P.S. RAW GAS PILOT
RECESSED REFRACTORY FACING

Our "AIROCOOL" Nozzles have the deserved reputation of outlasting under fire, two to five times, the ordinary inspirator gas burner nozzles. Consequently, they reduce the frequent labor costs, inconvenience, and overhead item of making replacements.

Renewable type recessed gas tips direct the separate igniter flames against the main volume of the mixture to insure stable ignition . . . and allow greater turn-down without burnback.

"AIROCOOL" Nozzles are made exclusively by us. They are stocked for standard pipe thread sizes 4, 5, 6 and 8 inch for various makes of inspirators. Ask for Supplement 3 to Bulletin 55 . . . it gives detailed information.

Recessed facing of refractory insulating plastic protects nozzle from extreme heat and prolongs nozzle life.

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INDUSTRIAL OIL BURNERS, GAS BURNERS, FURNACE EQUIPMENT

Institute of Gas Technology Annual Meeting Oct. 28th

The Seventh Annual Meeting of the Members of the Institute of Gas Technology was held October 28 on the Technology Center campus in Chicago.

The Annual Meeting of the members was preceded by the 21st meeting of the Executive Committee of the Board of Trustees presided over by Board Chairman Frank H. Lerch, Jr. This meeting was held primarily to obtain the Executive Committee's recommendations for Trustees to succeed those whose terms were expiring that day and for the new Trustees to be added to the Board in the event of favorable action by the members on the proposed amendments to the By-Laws increasing the number of Trustees. The Chairman was authorized to present the Committee's recommendations to the Annual Meeting as nominees.

At the seventh Annual Meeting of the Members, which was held immediately following, President Henry T. Heald presided and 21 associate member companies were present by representatives and 13 by proxy. The first action consisted of approval of the proposed amendments to the By-Laws increasing the total number of Trustees from twenty-two to twenty-eight and increasing the representation of Illinois Institute of Technology Trustees on the Board from four to five. The resignation from the Board of Trustees of E. M. Farnsworth, who has recently retired from the presidency of Boston Consolidated Gas Company, was accepted with regret. Mr. Lerch then presented the Executive Committee's recommendations for nomination as Trustees under the amended By-Laws and the nominees were elected unanimously.

Trustees Elected at Annual Meeting

For the Term Expiring in 1949, Henry Fink, President, Michigan Consolidated Gas Company.

For the Term Expiring in 1950, Harry K. Wrench, President, Minneapolis Gas Company.

For the Term Expiring in 1951, F. M. Banks, Vice-President, Southern California Gas Company.

Henry R. Cook, Jr., Vice-President, Consolidated Gas Electric Light and Power Company of Baltimore.

James D. Cunningham, President, Republic Flow Meters Company.

E. H. Eacker, President, Boston Consolidated Gas Company.

R. H. Hargrove, President, Texas Eastern Transmission Corporation.

James F. Oates, Chairman of the Board, Peoples Gas Light & Coke Company.

Marcy L. Sperry, President, Washington Gas Light Company.

Paul R. Taylor, Vice-President, Consolidated Electric & Gas Company.

George S. Young, Vice-President, Columbia Engineering Corporation.

Immediately following luncheon, President Heald reconvened the Annual Meeting and called upon Director E. S. Pettyjohn to introduce the Fellows and staff members to the group of gas company representatives. President Heald then introduced the speaker of the day, Frank C. Smith, President of Houston Natural Gas Corporation, whom he characterized as the man who had made the greatest single contribution to the Institute's founding through his service as chairman of the Research Institute Organization Committee and first Chairman of the Board of Trustees. Mr. Smith took as his subject the events leading to the founding of the Institute and the accomplishments which it has made during seven years of service to the Gas Industry.

Frank C. Smith

Following Mr. Smith's address the Annual Meeting of the Members was adjourned and was followed immediately by the 7th regular meeting of the Board of Trustees. The single item of business transacted by the Board was the election of Frank H. Lerch, Jr., and Raymond J. Spaeth to succeed themselves, respectively, as Chairman of the Board and Secretary-Treasurer.

Following adjournment of the Board of Trustees Meeting, the group made a brief inspection tour of the Technology Center Campus and assembled at the corner of 34th and Dearborn streets to witness the ground-breaking ceremony for the Institute's new building.

As Frank H. Lerch, Jr., Chairman of the Board of Trustees, turned the symbolic first spadeful of earth, the feeling of dedication to a bright future of useful service earlier engendered by Mr. Smith's address was further intensified.

Consisting of two stories with a full basement, the new building will be 180 feet long by 75 feet wide and will conform in exterior design with the new buildings which are being erected by Illinois Institute of Technology on the Technology Center campus. The new building will house the Institute's precision laboratories, some of its research laboratories, its library, information service, classrooms, and administrative and business offices. The cost of the building is estimated at approximately $400,000. However, research equipment, educational facilities and the library's collection on gas technology will bring the total investment to well over $750,000.

Funds for the new building are being contributed by progressive gas companies all over the country. The American Gas Association's Committee for Promotion, Advertising and Research is lending its fund-raising facilities for the solicitation, and the gas companies have been asked to contribute annually over a period of three years which began in 1947. Over 140 companies contributed some $137,500 as a result of the 1947 solicitation. It is anticipated that like sums will be made available during 1948 and 1949.

Gas Machinery Company Adds to Eng'g. Staff

The addition of two new members to the Engineering Division of The Gas Machinery Company is announced by K. W. Stookey, president. The men—Arthur W. Krause and Alvin M. Cunningham—will play an important part in the current development program being projected and carried out by the company.

A. W. Krause A. M. Cunningham

A graduate of Case Institute of Technology and a licensed chemical engineer, Mr. Krause recently served as a Research Engineer with the American Gas Association Laboratories in Cleveland, working on mixed gas research. His work with A. G. A. was primarily related to interchangeability of fuel gases, and he is preparing a thesis on this subject to obtain a master's degree in chemical engineering.

He was formerly employed in the Process Development Department of the Shell Development Corporation at Emeryville, California. During this period, he was directly concerned with the catalytic liquid phase isomerization of hydrocarbons and catalytic phase hydrogenation of an aromatic compound into an antiknock agent for gasoline.

Mr. Cunningham was also affiliated with the American Gas Association Laboratories. His previous duties as Chemist and Gas Analyst included domestic gas research and work on a mixed gas research project relating to interchangeability of gases.

A graduate of Bethany College, Mr. Cunningham worked for the Pittsburgh Division of the Pennsylvania Railroad Company before joining the American Gas Association.

Unique Method Employed for C. I. Pipe River Crossing by Public Service Electric and Gas Company

FOR the first time in the history of the gas industry, an 875-foot under-water gas main installation, without the use of piling, was completed recently by Public Service Electric and Gas Company, Newark, N. J., under the Raritan River at New Brunswick, N. J. This installation is part of an additional 16-inch main being constructed from the Central Gas Works, Raritan Township, through Highland Park, to New Brunswick to provide for increased gas consumption in the Central Division of the company.

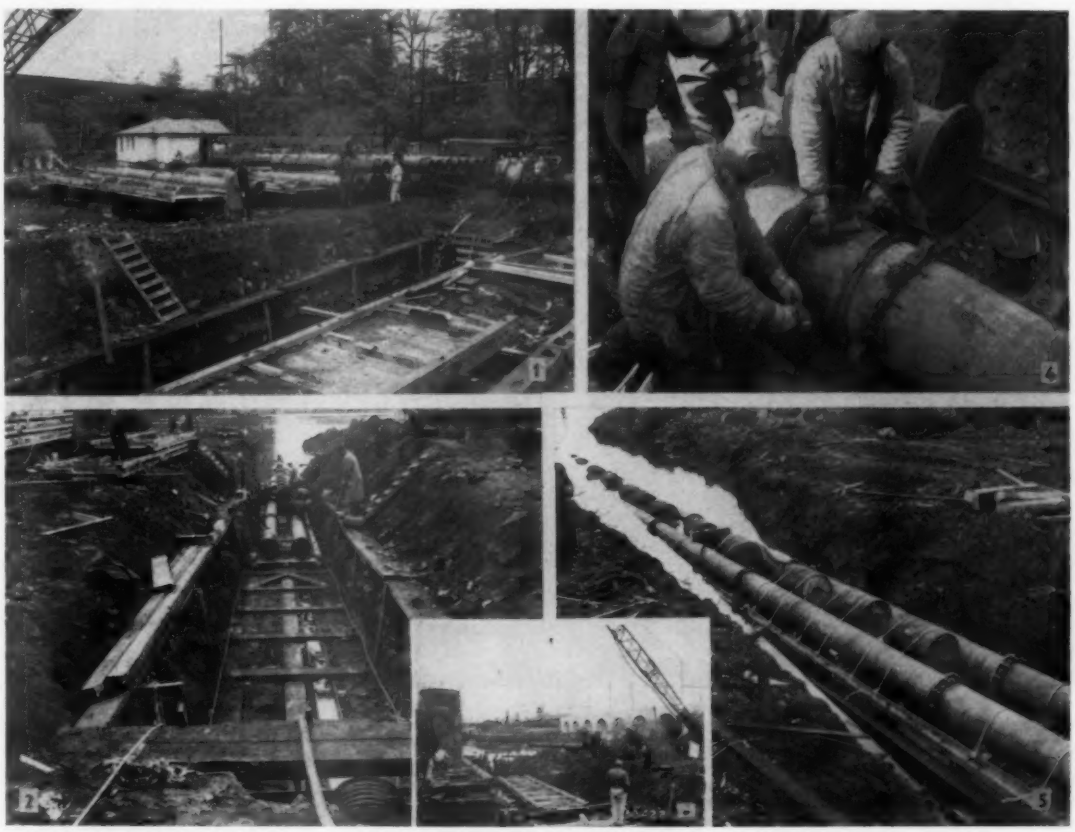
In previous river crossings, steel pipe has been pulled across or dropped into a trench. Through tunnels or along prepared river beds, flanged pipe or ball and socket pipe has been used. For the Raritan River crossing, a "spun" cast iron pipe, equipped with the "inner-tite" joint, was selected by the Public Service gas department engineers because of its flexibility. The engineers also decided to install the pipe by pulling it on sleds along the river bottom from the Highland Park side of the river to the New Brunswick bank.

On the New Brunswick side, a cofferdam was driven with an open end toward the river. The canal bank was opened to the river and the bed of both the canal and river prepared by digging a trench to the proper depth and leveling off the bottom by dragging.

On the Highland Park bank, a ramp was constructed from the water edge, inshore about 200 feet. It was on this ramp that the construction of the pipe line was done. The lines were then pulled from the ramp into the water and across the river and canal. The pulling force was provided by a steam crane, on the New Brunswick bank of the river, supplemented by two large trucks equipped with capstans. A cable, one inch in diameter, stretched from the crane drum, across the river, to the ramp.

As each sled, 36 feet long and 7 feet wide, was placed on the ramp, four lengths of 16-foot pipe (two for each line), were set in position on top and held to the sled by iron bands; the sled was pulled forward 36 feet and another lowered into place, secured by bolts to the previous sled. Pipe was lowered and jointed to the pipe on the forward sled. This operation was repeated about every half hour.

The pulling force necessary to drag the heavy pipe was kept to a minimum by the buoyancy of the wooden sled construction. This buoyancy was further augmented by attaching air tight steel drums to the sled and pipe. The assembly of photos show some of the details.



CAST IRON PIPE RIVER CROSSING AT NEW BRUNSWICK, N. J.

1—Pipe, in double lengths, being taken from stock pile to be placed on sleds.

2—Pipe placed in ditch resting on the sleds. Additional sleds are seen at upper left.

3—Two lengths of 16-inch pipe, supported by a "stiff-back," being lowered onto sled.

4—Caulkers inserting lead ring on "inner-tite" joint. Gasket, follower-ring and gland are shown in photo.

5—Pipe lines, resting on sleds with drums lashed on top to give additional buoyancy, move into the river.

Annual Meeting Independent N. G. A.—Harper Elected President

With the largest attendance ever registered at an annual meeting of the group, the Independent Natural Gas Association of America held its fourth Annual Meeting at Tulsa, Okla., October 26, and named A. B. Harper, president of the Arkansas-Oklahoma Gas Company, Fort Smith, Ark., as its new president.

Named to serve with Mr. Harper during the coming year were: J. H. Dunn, president of the Shamrock Oil & Gas Company, Amarillo, Tex., first vice president; William H. Wildes, president of the Republic Natural Gas Company, Dallas, Tex., second vice president; F. W. Peters, treasurer of the Oklahoma Natural Gas Company, Tulsa, Okla., was re-elected treasurer, and John A. Ferguson, Washington, D. C., was continued in his post as Executive Director.

Both Joseph Bowes, president of Oklahoma Natural Gas Company, Tulsa, Okla., and Paul Kayser, president of El Paso Natural Gas Company, Houston, Tex., the retiring president and first vice president, respectively, remain as members of the Board of Directors.

The one-day gathering was opened with an address of welcome by Mayor Roy Lundy of Tulsa, and this was followed by the "President's Report" by Mr. Bowes, who enumerated and commented upon the various activities in which the Association has participated during the past year and the progress and accomplishments of the Association.

While expressing regret over the failure of Congress to give relief to the natural gas industry as was proposed in the Rizley-Moore bill, Mr. Bowes said he does not feel that the time, energy and money put into that effort can be considered as having been wasted, and added:

"At least we brought our foes out into the open. We have been shown to what extremes they will go in their effort to defeat us and the kind of game they play. In future activities, therefore, we will be in a better position to know what to expect from them and how we should prepare ourselves for meeting them."

In discussing "Natural Gas Reserves in the United States," the next speaker, N. C. McGowen, president, United Gas Pipe Line Company, Shreveport, La., revealed that the American Gas Association Committee on Reserves, which he heads, plans to broaden the scope of its studies this year. The Committee, he said, will give particular attention to gas in underground storage with a view to avoiding the possibility of duplication in production figures. Also, he said, his committee plans to consider the advisability of issuing a set of definitions covering the terms generally used in natural gas production.

H. Leigh Whitelaw, managing director of the Gas Appliance Manufacturers Association, New York City, in discussing "What's New In Steel," revealed that the natural gas pipeline system today exceeds the railroad mileage in the United States by 17,000 miles, and exceeds the oil pipe lines by more than 100,000 miles, and he added:

"If the unbalance between the cost of gas and the present cost of oil and coal continues, our gas transportation system could be doubled in the next 10 years and still fail to satisfy our demands. It isn't difficult to see that steel practically becomes the deciding factor of how far and how fast we are going."

In this report Mr. Ferguson went into considerable detail concerning what transpired during the last session of Congress with reference to the Rizley-Moore bill. He explained how the false propaganda issued by some of those at the Federal Power Commission had played an important part in injecting politics into the gas legislation and how this was largely responsible for the failure of the legislation to pass. Mr. Ferguson urged, therefore, that the industry undertake a broad educational program to acquaint the public with the vital necessity of the legislation.

Marshall Newcomb, general counsel for the Lone Star Gas Company, Dallas, Tex., and a member of the INGAA Legal Committee, presented the report of the Legal Committee under the title "Recent Legal, Regulatory and Legislative Events Affecting the Natural Gas Industry." In his presentation, Mr. Newcomb covered the conclusions of the members of the FPC in the Docket G-580 proceedings; activities connected with efforts to amend the Natural Gas Act during the last session of Congress; types of conditions the FPC has been attaching to certificates of convenience and necessity during the past year; allocations of supply made by the FPC; the common carrier status of natural gas pipe lines; refunds; the proceedings in connection with the FPC's amendment of "Forms, Composition, Filing and Posting of Rate Schedules and Tariffs for the Transportation or Sale of Natural Gas Subject to the Jurisdiction of FPC"; financing; state taxation and regulation.

Red hot water heater salesmen and dealers of Guenther Gas Appliances, Servel distributor in Dallas, Texas were given a trip to the Servel factory in Evansville recently by the distributor. They are, first row left to right, Emil Nensel, Servel, Water Heater Service Manager; Tom Dinning, Star Furniture Company, Kilgore, Texas; Charles Wood, Wood Gas & Appliance Company, Linden, Texas; A. W. Lynch, District Sales Manager for Servel; Stanton Cline, Guenther Gas Appliances; Lester Grogan, Grogan Butane Company, Atlanta, Texas; A. L. Delcambre, Butane Gas Sales Company, Inc., Dallas, Texas and Cary Miller, Servel Service Representative.
Second row: H. F. Zipf, Guenther Gas Appliances; Leland M. Feigel, Sales Manager, Servel Water Heater Division; R. R. Guenther, Guenther Gas Appliances; E. L. Anderson, Guenther Gas Appliances; D. E. Wilson, Liquigas Company, Waxahatchie, Texas and O. E. Dawson, Morris Butane Gas Company, Sherman, Texas.

METER REPAIRS

We offer a meter repair service that is prompt and efficient on all types of gas meters.

Our staff of skilled mechanics have had 25 years experience in this work. We can assure you of satisfactory service on a trial shipment of meters.

Adjusting, Clean and Oil or New Dies.

Correspondence regarding details invited

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127-27 Willetts Point Blvd.
Corona, L. I., New York

New Equipment and Appliances

New Pipe Locator

This new lightweight locator, although on the market for a short time, has proved itself completely, one Southern California gas company already having over 50 in use.

Weighing only 11 lbs., it is easily operated by one man with no special training. It shows the exact location of mains, services and stubs, follows the course of underground drilling and measures the depth of pipes without calculation. Low cost portable radio batteries and flashlight cells are used which assures inexpensive upkeep.

Model 87 Pipe Locator

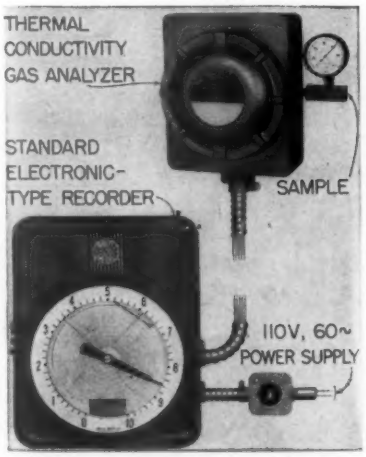
The Model 87 Pipe Locator is manufactured by The Goldak Company, 1543 W. Glenoaks Blvd., Glendale 1, California.

Gas Analyzer

Bailey Meter Company, Cleveland, Ohio, includes in its line of automatic gas analyzers and recorders, a thermal-conductivity type gas analyzer.

The analyzer works on the standard principle of thermal-conductivity gas analysis which measures the rate at which heat is conducted by the gas being sampled.

It is mounted in an explosion-proof case and is unaffected by voltage variations, ambient temperature, and variations in sample pressure. An all a-c circuit is employed, permitting the use of a standard Bailey Electronic Recorder which does not require dry batteries or a standard cell.



Thermal-Conductivity Gas Analyzer.

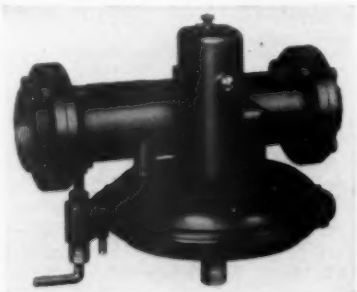
Two records of thermal-conductivity can be placed on the same 12-inch diameter uniformly graduated chart or one record may be combined with another of flow, pressure, temperature or some other related factor.

Temperature Control Valve

The Improved "CR" McKee Automatic Temperature Control Valve is designed for use on all types of combustion systems controlled by air, where a smooth, gradual hi-lo control action is desired. Pressure range, 2 oz. to 4 pounds.

All main castings are of aluminum, so the valve is 50% lighter in weight than previous types, making it easier to handle and ship.

Motive power for this valve is supplied by the same air that is being regulated—a unique feature. A small amount of air is required, and control is by an 8-watt solenoid, a steam pressure valve, or a thermostat.



McKee Control Valve

Can be used with either a single or two-pipe system. It is available in 3 types: CRS for Solenoid, CRB for Steam and CRP for Thermostatic.

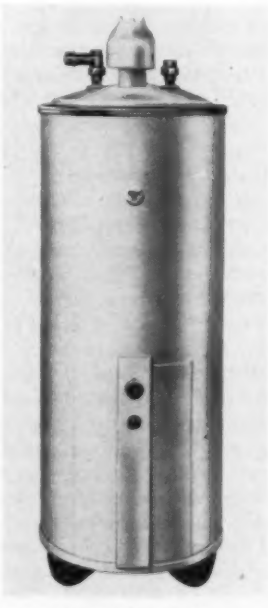
Details in Bulletin M-200, Eclipse Fuel Engineering Co., 782 So. Main, Rockford, Ill.

Newest "Rex" Water Heater

Cleveland Heater Co. unveiled its latest ultra-modern "Rex" water heater at the Gas Exhibit at Atlantic City.

This newest heater, called the "XL" model, was planned as much for its obvious eye-appeal as for its efficiency.

There are no projecting parts. All functioning parts, the thermostat, and the gas safety pilot are completely concealed. This not only offers a trimmer appearance, but keeps these vital parts clean and free of clogging dust and dirt particles.



Rex Water Heater

Low contours make it unusually convenient for the kitchen or basement recreation rooms. The efficient insulation, and highly effective burner afford economic operation.

Safety pilot and a temperature and pressure relief valve are included as well as the heavy, tested storage tank provided with "Elno" anti-rust rod perfected at The Cleveland Heater Co.

Correspondence

Trade-in? So What.

Editor American Gas Journal
Dear Sir:

Looks to me like the boys are facing a new problem which will give them gray hair if not ulcers. When talking to several of them during our browsing about lately they told me that the trade-in problem is one they are giving a lot of serious consideration to these days. Several of them are definitely of the opinion that the day of an excess of new users, (gravy train buyers), is on the wane. One fellow said that over 50% of all his prospects in recent weeks has been what we call replacement prospects. He said their story is "Our range is perfectly good but it just isn't modern looking. It bakes fine, and top cooking is just as good as ever but we would like to have one of these new ranges. However, we think the price is very high so unless we can get an allowance for our old range we just can not buy the new one even though we would like to have it."

These replacement prospects are bringing about a serious consideration of a trade-in plan. In formulating such a directive, we invariably come up against these questions; What can we afford to allow? We absolutely can not include them in our mark-up because we all know that prices are high enough now. If we take in the old ranges with the hope of reconditioning them, at what price could we offer them for the resale? With present costs of labor and the inability to secure parts, it would mean that we would be forced to build up a price figure which would not move them. At any rate, we seriously doubt whether we could move them fast enough to keep from having a colossal storage space problem.

Another man we spoke with said he had many prospective purchasers for new refrigerators—again—IF SOME ALLOWANCE CAN BE MADE for the old boxes. "This," he said, "is quite a different problem from range trade-ins. In range trade-ins, if the range can be rebuilt and resold, it goes back on our gas mains and uses gas. In refrigerators we do not have the facilities to recondition and even if we did have them we would not want to do it for the simple reason that we do not want them back on our lines."

This then brings up a prize question to which we do not have the correct answer—"WHAT WOULD WE DO WITH THE OLD BOXES IF WE SHOULD TRADE THEM IN?" The only answer we can come up with at the moment is—sell them to out-of-town dealers. That of course immediately brings up another sales problem which we are not set up to cope with. Thus—the trade-in is still the $64.00 question for us to ponder over for we do feel that the day is not far distant when we are going to have a refrigerator replacement market to face.

"So," said the old timer, "that gives us another problem to solve for the boys." We had better meander on and see what some of the other fellows are going to do about it because we think the trade-in problem is one that all of us are going to be confronted with — b u t s o o n —.

OLD TIMER

R. T. Killian Elected Chairman of GAMA Marketing Committee

R. T. Killian, of the Bryant Heater Company, Cleveland, Ohio, and Carl J. Dinic, of the Rheem Manufacturing Company, New York, N. Y., recently have been elected to serve as Chairman and Vice-Chairman, respectively, of the GAMA Marketing Committee.

Mr. Killian, who is manager of the Market Development and Research Department of Bryant Heater, is a graduate of Miami University. Prior to coming with Bryant he was engaged in marketing, statistics, and economic research work with Westinghouse Electric and the U. S. Steel Corporation. He succeeds Marc W. Pender of the American Stove Company as Chairman.

Carl J. Dinic, manager, Commercial Research with the Rheem Manufacturing Company, a year ago became Chairman of the Marketing Committee's Sub-Committee on Heating & Air Conditioning Equipment.

A.G.A. at the Hotel Show

The largest Hotel Show ever held closed its doors on November 12th after a week's run at Grand Central Palace, New York. All records were broken both for attendance and for the number of exhibitors in this 33rd Annual Hotel Exposition. 532 exhibitors crowded the four floors of the building, among which on the main floor was the largest single exhibit of the Show—The A.G.A. Combined Commercial Cooking Exhibit, where 15 manufacturers of heavy duty gas cooking equipment cooperated in one of the most successful Shows. Along both sides of the exhibit for over 200 feet there was almost 100% stainless steel equipment. Here and there an item of black steel stood out by contrast against bright sparkling stainless items. Gossip gathered here and there among the exhibitors reflects the success of the entire Show, and the manufacturers in the A.G.A. exhibit were very much pleased with the interest shown and in the number of orders taken.

The Commercial Gas Breakfast Held November 9th at Hotel Roosevelt, New York

The overwhelming response to invitations to the first Commercial Gas Breakfast was a gratifying surprise to all concerned. Nearly 100 editors of food publications, manufacturers of commercial cooking equipment and commercial gas men from sixteen states sat down to the first breakfast of this type ever held. So successful was this affair that its attendance for future years is assured. One of the reasons for its success was the speaker of the day, who was Don Nichols, President of Ahrens Publishing Company, New York. Mr. Nichols' talk was very well received and he had things to say of interest to everyone there. He briefly traced the history of the hotel and restaurant business over the past 25 years to the point where, "Hotel dollar room sales last year showed an increase of 141% over 1929. Food and beverage sales were 230% greater. Hotels today represent a property value of 5 billion dollars. Guests served by more than 500,000 employees in 1½ million guest rooms . . . restaurant sales in addition to hotels represent more than 7 billion dollars annually making this the third largest retail business in America exceeded only by grocery and department stores. These hotel and restaurant sales total 11½ billion dollars annually." Mr. Nichols stated further that there was a vital need for adequate trained employees in all phases of the hotel and restaurant business, especially in food service, as there is a definite trend toward more meals being eaten outside of the home. He stated that in 1929 18% of the family budget was for meals outside of the home, whereas in 1946 that figure has increased to 25.6%, and it is estimated that this will keep increasing until 1960. Mr. Nichols continued that hotel and restaurant operators will more and more depend on the kitchen equipment engineers and gas utility representatives than ever before.

News of the Gas Industry

Providence Gas Co. Announces Changes in Personnel

Providence Gas Company has announced promotions and appointments as follows:

Arnot Hirst now Appliance Sales Manager, has for the last twelve years been Assistant Appliance Sales Manager.

Roy W. Worrell, formerly New Business Adviser, has been promoted to Assistant Appliance Sales Manager. Mr. Worrell is a graduate of the University of Vermont and has served in various capacities with the company since 1933.

Edward P. Burke has been named as Assistant to the Appliance Sales Manager. His period of service with this company began in 1918 and he has served in various capacities in the Sales Department.

Laurence E. Wagner, formerly Chief Industrial Engineer, has been named Engineer of Utilization. Mr. Wagner's service with the company dates back to 1926. Previous to that, he was employed as an engineer with the United Gas Improvement Company of Philadelphia.

Eleanor Morrison to Head A.G.A. Home Service Committee

Eleanor Morrison, director of home service for the Western District of the Michigan Consolidated Gas Company at Grand Rapids, has been appointed Chairman of the American Gas Association Home Service Committee by W. M. Jacobs, Chairman of the Residential Gas Section for 1948-1949.

Eleanor Morrison

Miss Morrison joined the staff of the Michigan Consolidated Gas Company as Home Service Director in October 1945. In 1947 she was made director of home service for the Western District of this Company.

In addition to her work as Chairman of the A.G.A. Home Service Committee this year, Miss Morrison is also serving as President of the Michigan Home Economics Association for the term 1948-1950.

Louisville Gas Elects Three New Vice-Presidents

President T. B. Wilson, Louisville Gas and Electric Company, announced that at the meeting of the Board of Directors of the Company on October 5 the following officers were named:

J. J. McKenna, re-elected vice-president and treasurer.

A. W. Lee, re-elected vice-president in charge of operation.

Walter D. Myers, re-elected vice-president in charge of sales.

George R. Armstrong, promoted to executive vice-president.

Frank J. Pfeiffer, promoted to vice-president and secretary.

L. G. Dahl, promoted to vice-president.

Leslie A. Brandt Chairman A.G.A. Personnel Committee

Leslie A. Brandt, Chairman of the Great Lakes Personnel Conference of the American Gas Association and Assistant to the Vice President and Director of Employee Relations of The Peoples Gas Light and Coke Company, Chicago, Ill., has been appointed chairman of the A.G.A. Personnel Committee, it has been announced by Robert W. Hendee, President, American Gas Association and President, Colorado Interstate Gas Company, Colorado Springs, Colorado. Mr. Brandt has been employed by The Peoples Gas Light & Coke Company in various capacities since April, 1934. Born in Norway, Michigan, he received his degree as Master of Business Administration from the University of Michigan in 1931, and has been a Certified Public Accountant since 1935.

The A.G.A. Personnel Committee has just completed one of the most successful years since its inception, according to the report recently issued by C. G. Simpson, retiring chairman of the committee. It cooperated with the Association's Midwest and Southwest Personnel Conferences in a series of meetings that proved to be of great assistance to participating companies. Under the sponsorship of the A.G.A. Personnel Committee, the Great Lakes Personnel Conference of the A.G.A. was organized last year with representation from about 25 companies, having 50,000 employees.

Gas Supply Co. of Australia

The Gas Supply Company Ltd. of Melbourne, Australia in issuing its 22nd Annual Report, shows that gas sales have increased 110% in the period of the last ten years. Shortage of coal and labor and delay in obtaining materials for extension of works and mains have been the principal difficulties encountered during the last twelve months.

There has been an increase in the price of gas and by-products, but relatively less than in the cost of living. Profit position is satisfactory and a dividend of 5% for the year declared.

Uniform Systems of Accounts

The Uniform Systems of Accounts for Electric, Gas and Water Utilities, and Lists of Retirement Units for same, prepared by the National Association of Railroad and Utilities Commissioners, are again available from the Association's official publishers, The State Law Reporting Company, 30 Vesey Street, New York 7, N. Y.

These publications have been out of print for some time, and the urgent demand made it necessary to reprint.

Included in the series are the 1939 editions of Uniform System of Accounts for Gas Utilities ($3.50) and Lists of Retirement Units for Gas Utilities ($1.50). Also available are "Depreciation Principles and Methods" ($2.00) and 1922 edition of "Uniform Classification of Accounts for Gas Utilities" ($2.50).

Powdered Coal Gasification

The Gumz or Demag process for gasification of powdered coal is the subject of a report now available from the Office of Technical Services, Department of Commerce.

The report describes the results of three years of German pilot-plant research and concludes that, while the process is not ready for commercial exploitation, the record of experience in connection with this work will be useful as a basis for further American development.

PB 85163, Gumz Powdered Coal Gasification Process; 60 pages including photographs and charts, sells for $1.50 per copy. Orders should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C., accompanied by check or money order payable to the Treasurer of the United States.

Cast Iron Mains of the Brooklyn Union Gas Co.

More than 88% of the Brooklyn Union Gas Company's gas mains are cast iron. The oldest cast iron mains on record in their territory date back to 1852 and comprise 923 feet of three-inch, 1,852 feet of four-inch and 20,673 feet of six inch.

Morris Named to Eastern Post For Koppers Organization

W. Reed Morris, Vice President and General Manager of the Gas and Coke Division of Koppers Company, Inc., has been appointed eastern representative for the entire Koppers organization, it was announced recently by General Brehon Somervell, President.

Mr. Morris, whose headquarters are at Kearny, N. J., will continue his present duties with the Gas and Coke Division. In addition he will now be the company's chief administrative officer in the New York-New Jersey area.

Gas Meters Association of Florida-Georgia

A one day Technical Session of the Gas Meters Association of Florida-Georgia was held November 6th at Gainesville, Fla. The meeting was in charge of Joe Frink, chemist of Florida Light and Power Co. of Miami, while Irwin Wynn, Gainesville Gas Company, was host for the meeting which was followed by a barbecue at Mr. Wynn's farm near Gainesville.

Program of papers read at the meeting follows:

Mobile Radio Transmission for Gas Company Vehicles, W. W. Penick.

The Manufacture of Oil Gas for Fuel; K. W. Stookey, President, The Gas Machinery Company, Cleveland, Ohio.

Venturi Under Grates of Gas Machines; W. E. McMillan, Florida Power & Light Co., Miami.

Welding Equipment and Methods for Maintenance and Construction of Gas Mains and Services; O. K. Dixon, Peoples Water & Gas Co., Miami Beach.

Small Money-saving Economies in Gas Making; E. D. Werber, Atlanta Gas Light Company.

Breaking Up Tar Emulsions; Lambert Fredericks, Tampa Gas Company, Tampa.

A general discussion of gas technical subjects followed the program.

H. G. Dillin Appointed Comm. Manager at San Diego

H. G. Dillin, who has been associated with the San Diego Gas & Electric Company in various capacities since 1924, has been appointed Commercial Manager of the company. He has been serving as rate engineer since 1932 and prior to that was employed in the record, appliance sales, and new service departments. Dillin succeeds Alfred May, who recently retired after 37 years' service with the company.

Cut repeat calls on frozen Services and Mains

SERVONE offers full Winter protection against freezing of Mains and Services in exposed places.

NON-EXPLOSIVE . . NON-CORROSIVE
NON-INFLAMMABLE

One 8 oz. can will treat a 1½" Service 40 feet long.

CONVENTION CALENDAR

January

10–11 *A. G. A. Accounting Section,* Hotel Cleveland, Cleveland, O.

24–27 *A. G. A. Home Service Workshop,* Hotel Statler, Cleveland, O.

March

7–10 *National Assn. of Corrosion Engineers Annual Convention,* Cincinnati, Ohio.

17–18 *Oklahoma Utilities Assn. Annual Meeting,* Tulsa Hotel, Tulsa, Okla.

24–25 *New England Gas Assn.,* Hotel Statler, Boston.

April

4–6 *Distribution, Motor Vehicle & Corrosion Conference,* Netherlands Plaza Hotel, Cincinnati.

6–8 *AGA Sales Conference on Industrial & Commercial Gas.*

10–12 *Gas Meters Assn. of Florida-Georgia* Annual Meeting, Ponce de Leon Hotel, St. Augustine, Florida

11–13 *AGA-EEI Spring Accounting Conference,* Hotel Book-Cadillac, Detroit, Mich.

11–13 *Mid-West Gas Assn. Annual Convention,* Hotel Fort Des Moines, Des Moines, Iowa.

11–13 *National Association of Corrosion Engineers,* Netherlands-Plaza, Cincinnati, Ohio

12–14 *Southwestern Gas Measurement Short Course,* College of Eng'g., University of Oklahoma, Norman, Okla.

18–20 *Midwest Power Conference,* Hotel Sherman, Chicago, Ill.

20–22 *Southern Gas Assn. Annual Convention,* Buena Vista Hotel, Biloxi, Miss.

28–29 *Indiana Gas Assn.* French Lick Springs Hotel, French Lick, Ind.

May

9–10 *A.G.A. Natural Gas Dept. Spring Meeting,* French Lick Springs, Indiana

9–11 *Liquefied Petroleum Gas Assn.* Annual Convention and Trade Show, Palmer House, Chicago

9–13 *AGA Industrial Gas School,* Hotel Severin, Indianapolis, Ind.

12–14 *Southwestern Gas Measurement Short Course,* Univer- of Eng'g., University of Oklahoma, Norman, Okla.

17–19 *Pennsylvania Gas Assn.* Annual Convention, Galen Hall, Wernersville, Pa.

23–25 *AGA Production & Chemical Conference,* Hotel New Yorker, New York, N. Y.

24–27 *National Restaurant Exposition,* Atlantic City, N. J.

25–27 *Gas Appliance Manufacturers Assn. Annual Meeting,* Drake Hotel, Chicago.

26–27 *The Natural Gas & Petroleum Assn. of Canada Annual Meeting,* Hotel London, London, Ont.

Home Service Committee A.G.A. Plans Annual Workshop

The Home Service Committee of the American Gas Association met at Grand Rapids, Tuesday, November 9, 1948. Eleanor Morrison, home service director of the Michigan Consolidated Gas Company, presided as Chairman of the Home Service Committee.

The Plan of Work for the Committee includes sponsorship of the Annual A.G.A. Home Service Workshop to be held in Cleveland, January 24-27, 1949. A questionnaire on home service facts and figures will be conducted throughout the year; a project on "records and reports"; a study of trends in home calls; and a booklet on questions and answers to be used as part of the promotion in the 1949 Water Heating Campaign.

Indiana Gas Association

The next meeting of Indiana Gas Association will be held at French Lick Springs Hotel, French Lick, Indiana, April 28-29. Secretary-Treasurer is Clarence W. Goris, 500 Broadway, Gary, Ind.

Analyzing Gas Mixtures for Safety Precautions

Methods for utilizing analyses of complex gas mixtures as a basis for establishing safe procedures for preventing gaseous explosions and in controlling and extinguishing fires in mines, tunnels and industrial plants are described in a bulletin released recently by the Bureau of Mines for sale through the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. The publication, Bulletin 471, "Analyses of Complex Mixtures of Gases," sells for 75 cents a copy.

The Bulletin was prepared by S. H. Ash, Chief of the Safety Branch of the Bureau's Health and Safety Division, and E. W. Felegy, Safety Branch mining engineer, Salt Lake City, Utah. Included in the report are formulas and explanations, graphs, and data relating to explosibility factors applied to complex mixtures of gases consisting of carbon monoxide, methane, hydrogen, ethylene, propylene, carbon dioxide, nitrogen, and air.

Gas Appliances Displayed in a Modern "Seven-Way" Showroom

An example of what may be accomplished by the up-to-the-minute distributor is the new "Seven-Way" showrooms of Bryant-Johnson-Seier Company, of 210 South 18th Street, Birmingham, Alabama.

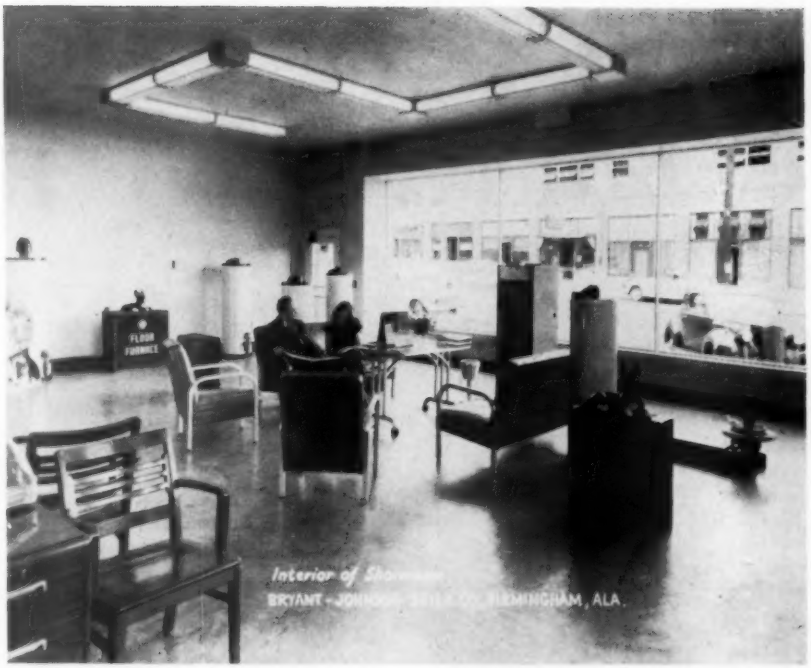
Well illuminated by both natural and diffused artificial light, ample space has been devoted to the display of the Bryant Water Heater, Consolaire, Boiler, and so on through the many Bryant products. Widely separated, and shown in attractive but subdued surroundings, the Bryant line is seen by customers in the most complimentary fashion. Distracting features have been minimized so that attention is centered on the products.

Comfortable chairs and sofas are provided together with plenty of table space for literature, advertising displays and convenience in writing up orders on the spot.

The furnishings are grouped so that salesman and principals are able to talk "family style" to visitors in ease and comfort.

The clean sweep of glass across the front of the building makes the entire interior of the showroom act as a window display in which an over-all picture of the Bryant line is presented for the benefit of passers-by. Over-all illumination makes the showroom an equally effective display at night.

Easy identification of products sold is of paramount importance if full advantage of both distributor, dealer, and company advertising is to be realized. Recognizing this fact, a large, highly legible sign announces Bryant Gas Heating over the showroom. At night, the sign is illuminated from behind to continue its function. Such a sign acts as a potent advertising medium in itself when so prominently displayed on a well traveled street. It serves as an eye-catcher for passing motorists, many of whom are from outlying districts or rural areas nearby.



Bryant Window Display at Birmingham, Ala.

Rockwell Mfg. Co. Announces Changes in Eng'g Dept.

The Rockwell Manufacturing Company has named C. B. Johnson as Chief Engineer and E. R. Gilmore as Director of Research for its Pittsburgh Equitable Meter Division. This move is a direct result of the Company's expansion program which necessitates the shuffling of key men to cope with the enlarged operations, both in its plants and in the field.

C. B. Johnson

E. R. Gilmore

C. B. Johnson, before joining Rockwell in 1929, saw service with Savage Arms Company, Remington Arms Company, New Departure Manufacturing Company and Westinghouse.

He started with the Pittsburgh Equitable Meter Company as a product engineer in 1929 and in 1941 went to the Pittsburg-DuBois Company as Chief Engineer. In 1944 he returned to Rockwell as Chief Engineer of the Nordstrom Valve Division.

E. R. Gilmore was formerly Chief Engineer of the meter and regulator divisions of the Company. His new duties will involve research, new products and giving closer engineering representation to the field.

Mr. Gilmore was graduated from Rensselaer Polytechnic Institute in 1920 and since that time has been engaged in work in the field of measurement and control. He joined the Pittsburgh Equitable Meter Company in 1936 and has guided the engineering and development of many new products, among them the new Rockwell-Emco 200 Domestic Gas Meter.

American Stove Company Offers Cooperative Dealer Helps

American Stove Company now offers a cooperative advertising plan to its dealers according to Lloyd C. Ginn, Advertising and Sales Promotion Manager. Dealers can thus tie-in locally on a share-the-cost basis with the big national advertising program being carried on by Magic Chef in the popular magazines.

So that the dealers can realize full advantage from this cooperative advertising plan, American Stove has published a mat book showing over 125 available mats. Sixty-five of them are brand new, complete newspaper ads of various sizes, covering practically any sales angle the dealer wishes to use. The rest of the mats are special feature cuts and cuts of the various Magic Chef models.

Full details may be obtained by writing to the Advertising Department, American Stove Company, 1641 S. Kingshighway, St. Louis 10, Missouri.

Inland Steel Container Co. Appoints Sales Manager

Joseph R. Pistorius has been appointed Manager of Sales of the Heater Division of the Inland Steel Container Company at New Orleans, Louisiana, according to an announcement by Gordon D. Zuck, General Manager of Sales.

J. R. Pistorius

Mr. Pistorius became associated with the company at its New Orleans plant in September 1940. He worked first in the factory office and then turned his attention to sales.

Following an interval of naval service he returned to the company upon his discharge and was appointed to the sales staff at the New Orleans plant in 1946 covering the surrounding territory until his recent assignment.

Pittsburgh Group, Columbia Gas, Adds to Distribution Staff

G. E. Wilson, superintendent of distribution for the associated companies in the Pittsburgh Group of The Columbia Gas System, Inc., has further expanded the Group's cadet engineering program by naming two new distribution engineers.

Paul M. Allen, Jr., a recent civil engineering graduate of Bucknell University has been appointed district engineer for the northern portion of The Manufacturers Light and Heat Co., distribution district No. 5.

James F. Baechtel, who recently completed the Grove City College general engineering course, has been named district engineer for the Cumberland and Allegheny Gas Company.

The cadet engineering program, under which these young men enter gas company employment, was established in 1947. According to Mr. Wilson, it has met all expectations in helping to improve the natural gas service to customers in the five-state area served by the Pittsburgh Group companies.

Appliance Dollar Sales Hit Four Million Mark for Brooklyn Union Gas Co.

Appliance sales for the first nine months of 1948 exceeded four million dollars as reported by the New Business Department of Brooklyn Union Gas Company. This is the first nine-month period in the company's merchandising history in which such a record was attained.

Dollar sales of appliances equaled $4,123,326.15, compared with $3,819,560.44 for the same period in 1947, a gain of $303,765.71.

The upward trend in appliance sales in the first eight months of the year continued during September. In that month sales totaled $494,777.87, an increase of $32,925.02 over August's accomplishments. Included were $472,514.79 in domestic appliances, $6,705.81 in industrial sales and $15,557.27 in commercial sales. The department sold 2,836 appliances including 121 Eton Universal CP ranges, featured in the September "Range of the Month" contest.

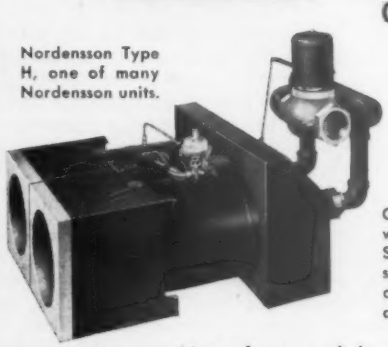
The New Business Department recently analyzed 5,540 retail range sales to determine the distribution of sales by models. The study showed that about one-half of the more than five and a half thousand retail range sales were of the CP type and that one-fourth were clock-controlled models.

Brooklyn Union cooperates heartily with appliance dealers, but the sales figures as listed above represent shipments out of the utility's own warehouse stocks.

Specify a NORDENSSON NATURAL DRAFT BURNER

A NATURAL FOR LOW FIRST COST
A NATURAL FOR DEPENDABILITY
A NATURAL FOR ECONOMICAL OPERATION

Nordensson Type H, one of many Nordensson units.



Our factory engineers will gladly assist you. Send blueprints or sketch of combustion chamber and space available for burners.

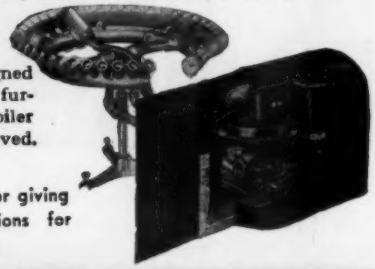
Manufactured by
ROBERTS-GORDON APPLIANCE CORP.
Specialists in Domestic, Commercial and Industrial Burners
137 ARTHUR STREET BUFFALO 7, NEW YORK

"The Gem of Them All"
COLUMBIA CONVERSION GAS BURNERS
More Popular Than Ever
With Home Owners and Dealers

DEALERS SAY—Columbia Nutipe Burner has a common sense design. Closely duplicates operation of appliance when solid fuel was used. Easy to install. Seldom requires service.

HOME OWNERS SAY—Gives quick heat transfer and earlier delivery of heat to rooms. Has tamper-proof controls and quiet operation.

MODEL P-ZE shown here is designed for use in warm air furnaces or round type boiler where grates are removed.



Send for free folder giving complete instructions for installing

THE COLUMBIA BURNER CO.
729 Ewing Street • Toledo 7, Ohio

Present at the dinner for Fred W. Gottschling were Messrs. Fuller, Barr Jr., Webb, Kuehnell, Winters, Flynn, Geitz of Consolidated Edison Co. of N. Y.; Goldsmith, Weber, Griffin, Sims, Dept, Stoeltzing of Brooklyn Union Gas Co.; Titus, Burns, Coon, Armstrong, Arment of Kings County Lighting Co.; Reilly, Godsoe, Keene of Brooklyn Borough Gas Co.; VanVliet, Muller, Fence of New York & Richmond Gas Co.; Gustavson, Strehle of Public Service Electric & Gas Co. of N. J.; Wilkins, Hartman of Rochester Gas & Electric Co.; Smith, Bagnall of the Public Service Commission of N. Y.; Powers, Grady, Kremer, McGourty, Blomquist, Picarelli, Giancaspro, Hartman, Baker, Spina of Superior Meter Co., Inc.; Burnham of Vulcan Proofing Co.

Superior Meter Co. Tenders Banquet to Gottschling

On September 30, Superior Meter Co., Inc. gave a banquet to celebrate Fred W. Gottschling's 30th year with the concern. Mr. Gottschling, Superior's factory superintendent, is one of the nation's recognized authorities on gas meters having worked for 45 years in this field.

In addition to Company officers and associates, the banquet was attended by many gas company executives and meter engineers who have known the guest of honor for many years.

Central Vermont P. S. Corp. Personnel Changes

Albert A. Cree, president of Central Vermont Public Service Corporation has announced three changes in officer personnel effective as of October 1. Glover W. Rogers has been elected treasurer, Horace J. Lyne has been elected auditor and Prescott H. Wellman, formerly secretary and treasurer, will continue as secretary having resigned from the treasurer's duties for reasons of health.

Rogers has been auditor and chief accounting officer of CVPS since the organization of the company in 1929, having been previously employed by its predecessor companies.

Lyne has been employed by Central Vermont Public Service Corporation since February 1945 as assistant to the auditor. From 1942 to 1945, he was assistant treasurer of Vermont Utilities, Inc., Chester, Vt., and chief accountant of Allied New Hampshire Gas Company.

Cooper-Bessemer Expands Its Engineering Facilities

The Cooper-Bessemer Corporation, will soon begin construction of a quarter million dollar addition to its main office building in Mount Vernon, Ohio, to provide more adequate facilities for its rapidly expanding research and engineering divisions.

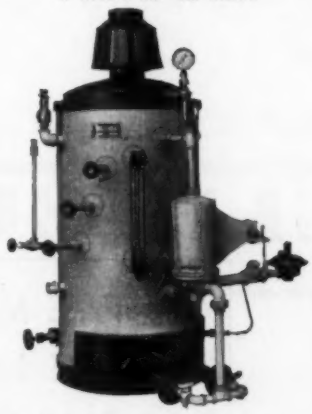
The new addition will provide some 19,800 sq. ft. of area exclusively for engineering and research activities, and will be connected with the company's main administration offices. Its two main floors will house the engineering staff, including designers, draftsmen and project engineers. In the basement will be a specially-constructed fireproof and bombproof vault, 15 by 62 feet, for storage of some 40,000 engineering drawings and records. The blueprinting and photographic departments will also be located in the new addition, to further streamline Cooper-Bessemer's engineering procedure.

Cooper-Bessemer's engineering and research division, like that of most important manufacturers in heavy industry has grown tremendously in recent years, and the refinements and developments it has originated are playing a major role in the company's rapid and permanent expansion.

G. W. Rogers H. J. Lyne P. H. Wellman

LATTNER GAS BOILERS

1 H.P. to 45 H.P.



2 H.P. Gas Fired Pressing machine boiler. 100 lbs. ASME Code.

P. M. LATTNER MFG. CO.

CEDAR RAPIDS, IOWA

Report on Catalytic Cracking Presented at A.S.M.E. Meeting

A comprehensive report on the catalytic cracking process for fuel gas production was presented by Dr. C. G. Milbourne, Surface Combustion Corp., at the 69th Annual Meeting of the American Society of Mechanical Engineers, in New York on December 1st.

Dr. C. G. Milbourne

Speaking on the program of the Fuels Division of the A.S.M.E., Dr. Milbourne described the latest developments in this new process by which gas utility companies can meet their peak load requirements. The process is considered by gas engineers to offer considerable promise as a base load gas plant.

The method has aroused wide interest among the executives of gas utilities and large industrial consumers of gas because of the highly versatile character of its operation which permits continuous gas service during the coldest days of the winter. Since the initial installation at the Riverhead plant of the Long Island Lighting Company, described in the July issue of AMERICAN GAS JOURNAL, construction is under way at three other gas companies. Dr. Milbourne supervised the starting of operations at two of these plants immediately prior to presenting his paper in New York. While the Riverhead plant was designed to operate on propane or butane, the newer plants can employ a broader range of hydrocarbon feed stocks ranging from natural gas to straight run gasoline. These feed stocks can be cracked down to a gas which matches in specific gravity and heating value the product normally distributed by the gas utility through its mains, and is completely interchangeable with the regular product.

Robinson Named Sales Manager Koppers' Metal Prod. Div.

Appointment of McMillan Robinson of Philadelphia as sales manager for the Metal Products Division of Koppers Company, Inc., was announced recently by Walter F. Perkins, Vice President and General Manager of the Division.

Mr. Robinson, who resigned as Vice President of the Ocean City Manufacturing Company of Philadelphia to accept the Koppers position, will be responsible for coordination of sales activities of the Division, development of policies, methods, organization, promotional activities, advertising programs, and merchandising plans.

Brandt Asst. Gen. Sales Mgr. Cribben & Sexton

John J. Brandt has been appointed assistant general sales manager of Cribben & Sexton Company, manufacturers of the Universal Gas Range, according to an announcement made November 11 by Harold E. Jalass, vice president and general sales manager. Brandt will continue to be sales promotion and advertising manager, his position previous to his new appointment.

Estate Heatrola Appoints Wyatt Division Mgr.

Appointment of J. Edward (Ed) Wyatt, Jr., of Dallas, Texas, as Division Manager, in the Texas area has been announced by Cecil M. Dunn, Director of Sales, Estate Heatrola Division, Noma Electric Corporation.

J. E. Wyatt

Mr. Wyatt came to Estate from Norge Division of Borg-Warner Corporation, where he was Manager of Contract Sales. Previously he had been Executive Vice President of Dearborn Stove Company, Dallas, where he was largely responsible both for the operation of the plant and its merchandising program.

The Reliable Shut-Off for Street Mains

THE GOODMAN STOPPER

Now has the "Z" handle for easy manipulation. When locked in place it holds. Stopper cannot slip. Gas cannot pass. Adjusted in 30 seconds.

Ask for circulars on this and other distribution equipment.

Nearly a half century of service to the Gas Industry.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, New York

CLEVELAND

"A" TYPE METERS
"B" TYPE METERS
DIAPHRAGMS

Cleveland Gas Meter Co.

ESTABLISHED 1875

2009 Rockwell Ave., Cleveland 14, O. Phone CHerry 2351

GPM
IRON HYDROXIDE

The mark of
unerring dependability
in purification

GAS PURIFYING MATERIALS CO., INC.

3-15 26th Ave.
Long Island City 2, New York

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1 MILLION CUBIC FOOT GAS HOLDER FOR SALE

Water seal type, low pressure holder available in Los Angeles "as is, where is" to the highest bidder. 1 MILLION cubic foot capacity as follows:

Diameter of water tank	**126**
Over-all height	**121'8"**
Number of lifts	**Three**

Holder may be inspected at 1700 Santa Fe Avenue, Los Angeles. Address inquiries to Mr. Wm. Maddock, Purchasing Agent.

Southern California Gas Company
Box 3249 Terminal Annex
Los Angeles 54, California

Position Open For Corrosion Engineer

Experienced corrosion engineer for electrolysis and corrosion mitigation work with large middlewest Gas Company. Please write full details concerning experience and other pertinent data. Address Box 195, c/o American Gas Journal, Inc., 53 Park Place, New York City 7.

Magnesium Anodes for prevention of corrosion in hot water tanks are described in folder issued by Magnode Products, Inc., 139 Banker St., Brooklyn 22, N. Y. These are extruded magnesium rods suitable for any size water tank.

FOR SALE

One complete water gas plant containing one 8 foot and one 4 foot water gas set with blower, exhaustor, condenser, 2 purifying boxes, relief holder, one 150 H.P. Boiler and one 80 H.P. Boiler (pressure 100 pounds on each).

Available as a unit or in part, for sale as is and where is.

Inquiries from vendors, dealers, operators invited.

Inventory on above and on coal gas plant equipment available on request.

N. G. Damoose—City Manager
City Hall Ypsilanti, Michigan

Blower For Sale

Used G. E. Centrifugal Blower, capacity 12,500 c.f.m. at 40" water pressure, driven by Curtis steam turbine, 150 lbs. per square inch pressure, 118 HP., 3400 r.p.m. Good Condition.

Long Island Lighting Company
(E. N. Scott) Mineola, New York

Plant Supt. Available

Young married man with 12 years experience in water-gas plant, 5 in maintenance, 6 as chief operator and 1 as plant superintendent. Available now. Willing to go anywhere. Address Box 194 c/o American Gas Journal, 53 Park Place, New York 7, N. Y.

3 MILLION CUBIC FOOT GAS HOLDER FOR SALE

Water seal type, low pressure holder available in Los Angeles "as is, where is" to the highest bidder. 3 MILLION cubic foot capacity as follows:

Diameter of water tank	**177**
Over-all height	**172**
Number of lifts	**Four**

Holder may be inspected at 1700 Santa Fe Avenue, Los Angeles. Address inquiries to Mr. Wm. Maddock, Purchasing Agent.

Southern California Gas Company
Box 3249 Terminal Annex
Los Angeles 54, California

Jet Blowers and Blast Nozzles: Steam Jet Blowers and Blast Nozzles for moving large volumes of gas at low drafts are described in new Bulletin 4-AB issued by Schutte and Koerting Company.

Tables, charts and drawings give complete data on dimensions, connection sizes, capacities and costs. Colored diagrams, with explanations, are used to illustrate typical applications of various types of blowers and blast nozzles. For copy, write Schutte and Koerting Company, 12th and Thompson Streets, Philadelphia 22, Pa.

High BTU Gas

(Continued from page 18)

that for a standby plant the use of oil burners for heating reduced to a great degree the operating difficulties experienced with coke fuel. Difficulties in obtaining oil and its high cost are unfortunate, however it is probably a matter of no great difference whether it is necessary to purchase 9 gallons of oil and 20 lbs. of coke per Mcf of gas produced or 12 gallons of oil. The purchasing problems are about equal.

There are undoubtedly numerous details of operation which would be of interest to those who are involved in producing High Btu Oil Gas which cannot be described here. It is our desire to be of assistance to operators where our experience can be helpful.

Presented at the 25th Mid-West Gas Conference & School, Mid-West Gas Ass'n. & Engineering Extension Service, Iowa State College, Ames, Sept. 13, 14, 1948.

Wisconsin Assn.

(Continued from page 33)

factured," was one definite conclusion reached by Anderson.

Theron Brown, vice president, Madison Gas & Electric Co., was elected chairman of the Technical Division of the Gas Section. G. G. Ellerbrock, gas engineer, Wisconsin Public Service Corporation, Oshkosh, was elected vice chairman.

J. H. Dunham, promotional director, Wisconsin Gas & Electric Co., Racine, was elected chairman of the Commercial Division of the Gas Section. Eugene P. Mink, sales manager, Wisconsin Southern Gas Co., Burlington, was elected vice chairman.

American Stove Co. Issues New Edition of Cook Book

The new 1948 edition of the "Magic Chef Cooking" is now ready for distribution. This is a completely new revision of the cook book that has been used in homes, schools, laboratories, and home demonstration kitchens for 25 years.

This is a beautiful, full color, plastic bound book of 140 pages. It was prepared and edited under the direction of Dorothy E. Shank, nationally known home economist. It is profusely illustrated with mouth-watering four color pictures of deliciously prepared food. There are many new recipes, made up particularly with an eye toward the budget side of the menu. The book is spiral bound so that it will lie flat when opened up. It's no longer necessary for Mrs. Housewife to balance a bowl on one page and a dish on the other in order to keep her place.

The 1948 edition of "Magic Chef Cooking" retails at $1.50.

Servel Appoints Miss Carnes

Martha Carnes, former assistant Home Economics Director for Servel has been appointed Director of Home Economics for Servel's Homemaker's Institute.

Martha Carnes

The announcement was made by R. J. Canniff, Advertising and Sales Promotion Manager of Servel. Miss Carnes, who joined Servel in 1946, is a former dietician of the Welborn Memorial Hospital in Evansville. She is a graduate of Purdue University and a native of Evansvile.

Tennessee Gas Transmission Expands Pipe Deliveries

President Gardiner Symonds of Tennessee Gas Transmission Co. has stated that the acceleration of pipe deliveries during recent months through tradeout arrangements with other companies has permitted the Company to substantially complete its expansion to a capacity of 600 million cubic feet per day. Deliveries now are approximately 525 million cubic feet daily and should reach and be maintained at 600 million cubic feet daily before Dec. 1.

As to future increases, the Company has made a transportation agreement with The Manufacturers Light and Heat Company of Pittsburgh to transport for them approximately 111 million cubic feet of gas daily. To do so the Company must construct, with approval of The Federal Power Commission, a portion of the facilities for which it has previously applied in connection with its Buffalo extension. Permission has been asked to construct 338 miles of 30-inch, 330 miles of 26-inch, and 86 miles of 24-inch main line loops, and add approximately 27,200 horsepower of compression in existing or authorized compressor stations. Estimated cost of these facilities is approximately $65,500,000. The Company has finished the presentation of evidence to the Commission supporting this application.

Combination Oil-Gas Burners. Catalog 408 recently published by Hauck Mfg. Co., 124 Tenth Street, Brooklyn 15, N. Y., describes the Hauck Combination Burner for industrial use. One operating lever controls flow of oil or gas and air, well illustrated and has table of capacities.

Con. Gas of Baltimore Appoints Ramsey as General Counsel

Alfred P. Ramsey, who has been Assistant General Counsel for the Consolidated Gas Electric Light and Power Company of Baltimore since 1927, has been appointed General Counsel of the utility, President Wm. Schmidt, Jr. announced recently.

Emco Tin Gas Meters Now Rust Protected

The Pittsburgh Equitable Meter Division of Rockwell Manufacturing Company has revealed that Emco tin gas meter cases are now being given a prime coating of zinc chromate as a rust preventative when customers specify it.

This process was developed during World War II and is now considered the best primer obtainable for metals subject to corrosive atmosphere. The coating is applied by an electrostatic process to seal the pores of tinned surfaces. The electrostatic process permits the application of a heavier coat of zinc chromate than can be obtained by standard spraying procedures; also a more even coat of paint for better product appearance.

F. G. COTTRELL

Dr. Frederick G. Cottrell, chemist and one of the world's outstanding scientists, died in Berkeley, California, on November 16th. He was seventy-one.

Dr. Cottrell, who was attending a meeting of the National Academy of Sciences, collapsed on the steps of Lewis Hall at the University of California and was pronounced dead of a heart ailment at a hospital.

He developed what came to be called the Cottrell Electrical Precipitator and persuaded a group of New Yorkers to take over his patents and to found the Research Corporation of 405 Lexington Avenue. The corporation exploited his patents, but all its profits went back into scientific research. It helps support the Smithsonian Institution and other scientific bodies, as well as individuals.

Dr. Cottrell also was the inventor of a process that reduced the cost of helium from $1,700 a cubic foot to 10 cents. For this he received the 1937 engineering award of the Washington Award Commission.

E. M. STURTEVANT

Edwin M. Sturtevant, prominent Baltimore lawyer and General Counsel of the Consolidated Gas Electric Light and Power Company of Baltimore, died Friday morning at the Union Memorial Hospital after a short illness. He was born in East Orange, New Jersey, on June 14, 1887.

Mr. Sturtevant was a graduate of the University of Maryland Law School and studied Constitutional and International Law at Johns Hopkins University. He was regarded as an authority on Public Utility Law and was the author of numerous papers on legal and allied subjects.

He entered the Legal Department of the Gas and Electric Company in January 1912, and was made General Council on July 1, 1927.

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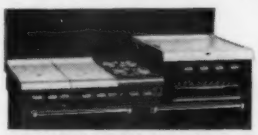

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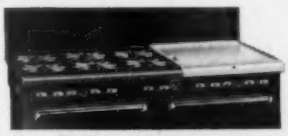

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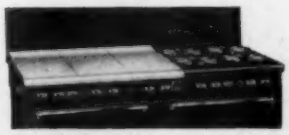

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